NOVEMBER 16, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

A PROGRAM FOR MANAGEMENT 1959 . . . No. 10

The Manager of the Future

PAGE 99

Metalworkers Urge Steel Industry To Hold the Line—A STEEL Survey

When Can You Expect to Get Steel?

Stepped-Up Recruiting and Training: Your Best Manpower Insurance

Blast Descaling Cuts Pickling Costs

Metal Stitching: Here Are the Jobs It Can Do and Costs It Can Cut

Electrical Sheets: Record Year Ahead

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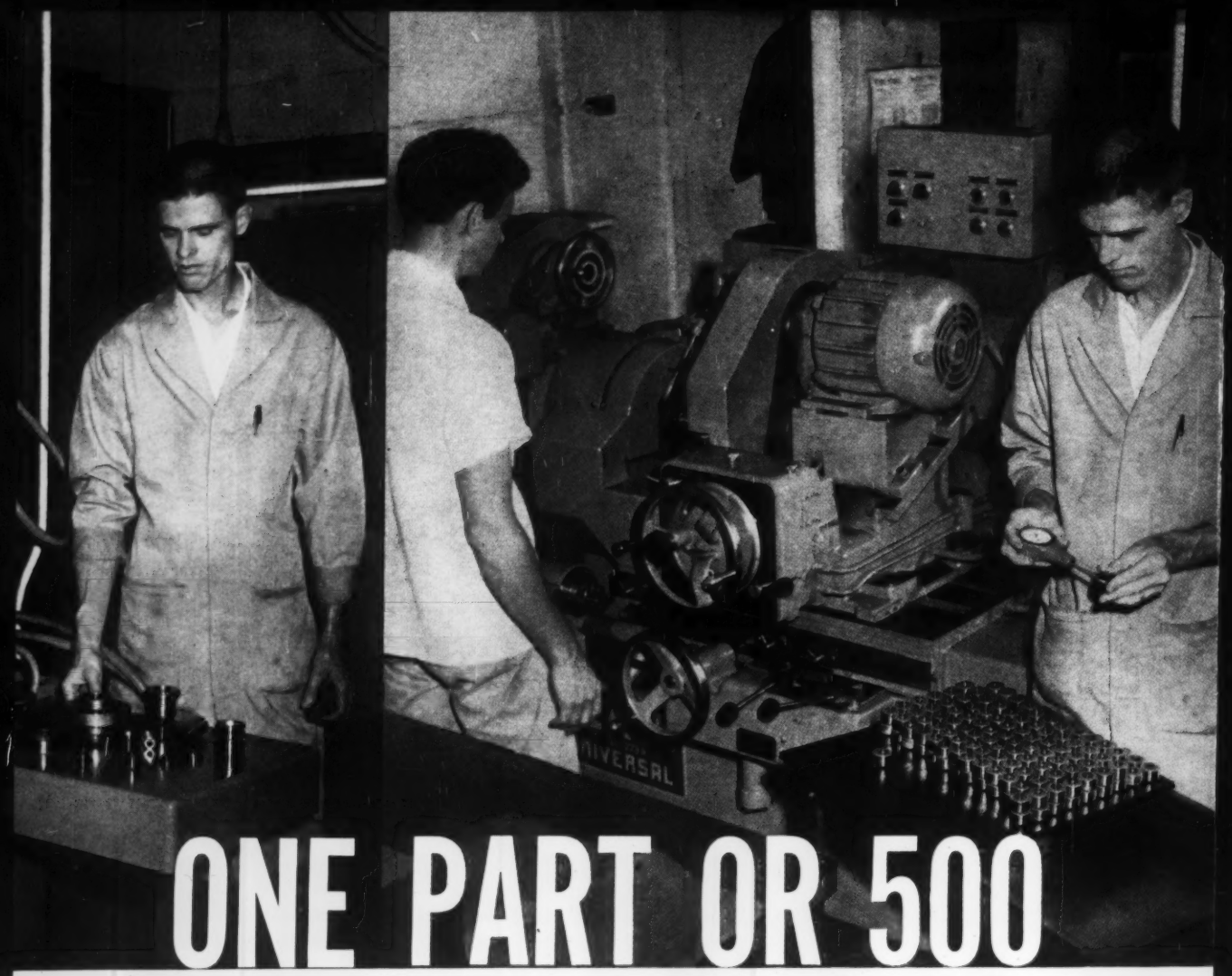

ONE PART OR 500

Selco gets top grinding performance at rock-bottom cost with the

NEW HEALD MODEL 273A UNIVERSAL

The Heald Model 273A Universal Internal Grinder shown above is installed at the Selco Grinding Company — a small but busy job shop in southern California. Here it is used to grind straight or tapered I.D.s and O.D.s, and for rotary surface grinding of flat, convex or concave surfaces of a wide range of work — from individual parts to production runs. And it easily handles every job with far greater speed, accuracy, precision and finer finish than could be obtained on any of their previous equipment.

Until the advent of this Universal Grinder, most small job shops (and many larger ones, too) couldn't afford a machine of this type. But the Heald 273A costs about *half* as much as comparable machines today, and less than similar machines (with fewer features) cost in 1947!

Incorporating the latest advances in the grinding art, it holds tolerances to within .0001" in routine production, and within .000050" in special cases. Features include hydrostatic antifriction ways, full 20" table travel, several wheelhead positions, infinitely variable workhead speed from 150 to 450 rpm and 90 degree workhead swivel for rotary surface grinding.

Ask your Heald engineer for information on the New 273A — the only completely new machine with 1959 performance and a 1947 price tag.

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • New York • Philadelphia • Syracuse

HEALD

It PAYS To Come To Heald

This Week in STEEL the Metalworking Weekly

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Index available semiannually.

STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED NOV. 7	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	111†	115	118	152

†Preliminary.

Of the four segments comprising STEEL's industrial production index, only auto production will not be affected immediately by the steel strike injunction. Within the next three weeks, the trend line will climb better than halfway back to prestrike levels.

Details on Page 77

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED NOV. 14	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled ..... (Source: Ward's Automotive Reports.)	62,000*	65,369†	133,480	117,688

*Estimated. †Preliminary.

The resumption of steelmaking came too late to prevent serious dislocations within the Big Three. It may help Ford and Chrysler to limp through until new supplies show up, but GM is shut down.

Details on Page 73

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED NOV. 15	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	1,133*	368	368	2,011
Index (1947-49=100)	70.5*	22.9	22.9	125.2
Percentage of capacity	40.0*	13.0	13.0	74.5

*Estimated by STEEL; comparative figures reported by AISI.

Mills have been able to resume operations at a much faster pace than had been anticipated. Work crews reported promptly as called and furnaces required less repairwork than had been feared.

Details on Page 150

STEEL SCRAP PRICE COMPOSITE

	NOV. 11	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$45.33	$45.33	$44.33	$42.33

Reopening of steel mills proceeded smoothly without causing a ripple in the scrap market. Supplies at furnaces were ample for making initial charges and are being augmented by shipments of material ordered prior to the shutdown. The market may move higher soon.

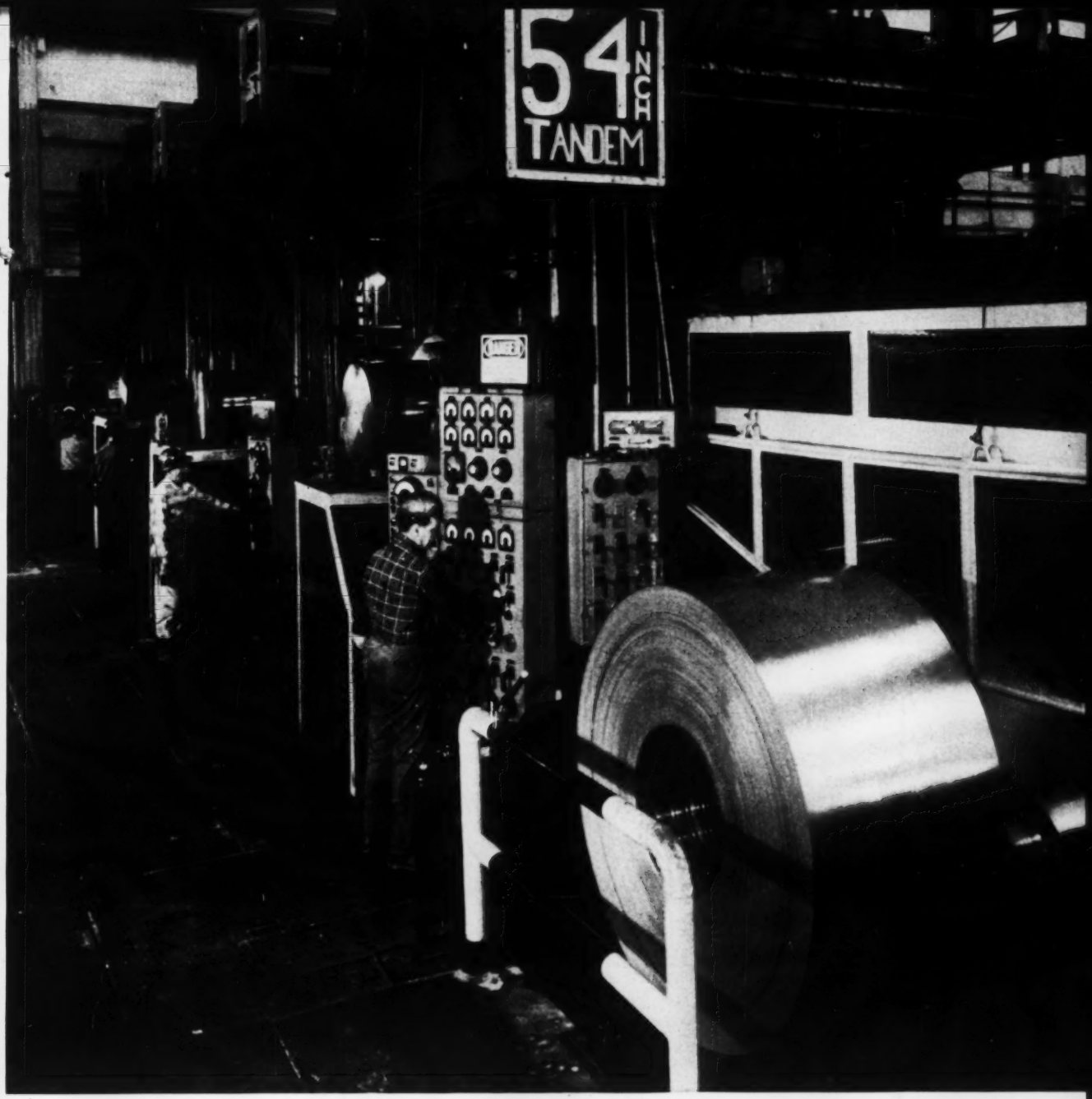
Details on Page 163

FINISHED STEEL PRICE INDEX

	NOV. 10	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8	186.8	186.8	186.9

With steelmakers operating under provisions of the old labor contract, a stable market for finished steel products is practically assured for the balance of this year.

Details on Page 151



We baby these sheets to do a man's job

Here goes a coil of Bethlehem sheets, sinewed to stand up under rugged duty, as only steel can. To bring sheets to this superlative condition, Bethlehem pampers them like a newborn babe.

From open hearth to shipping room, their progress is checked under the watchful eyes of man and X-ray. Slabs are expertly scarfed. Reheating is controlled by the latest scientific instruments. Rolling and coiling temperatures are carefully controlled.

The finished sheet—whether hot-rolled or sent through the 10 additional steps of cold-rolling—is the result of meticulous care all along the way. You can *always* count on Bethlehem sheets to do a man's job! Put them to the test in your plant.

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Export Distributor:
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BETHLEHEM STEEL

BETHLEHEM STEEL

COL. A. E. R. PETERKA, *Manager of Aircraft Sales, Lamson & Sessions, tells why...*

"Flying fasteners" keep our sights high

AT Lamson & Sessions, we're producing many types of special "astronautics fasteners"—for use in aircraft, engines, missiles, space satellites. This fact has important meaning to you, as a fastener buyer, whether or not you use these high-precision specialties. Here's why:

Engineering, inspection procedures, precision equipment at Lamson are geared to meet strict military and aircraft specifications, where required. Since we're set up this way, many of the same procedures and quality controls are applied to our production of commercial fasteners. This means you can expect, and get, superior quality and precision from Lamson.

New quality standards are being set in astronautics fasteners... to meet the grueling demands of supersonic speeds, severe "blast-off" stresses, higher operating temperatures. Just as automotive requirements raised Lamson's quality levels far above the wagon-buggy-and-plow days of 40 or more years ago—so have astronautics imposed a new set of standards. These permeate everything we do. And *all* our customers benefit!

Take advantage of the specialized engineering know-how and high quality standards available through Lamson... wherever you need fasteners for critical assemblies.

L & S Fastener Engineering helps you "tighten up" on...

- **PURCHASING COSTS**
- **INSPECTION AND HANDLING COSTS**
- **ASSEMBLY COSTS**

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5000 TIEDEMAN ROAD • CLEVELAND 9, OHIO

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Precision soldering 7 Times Faster...

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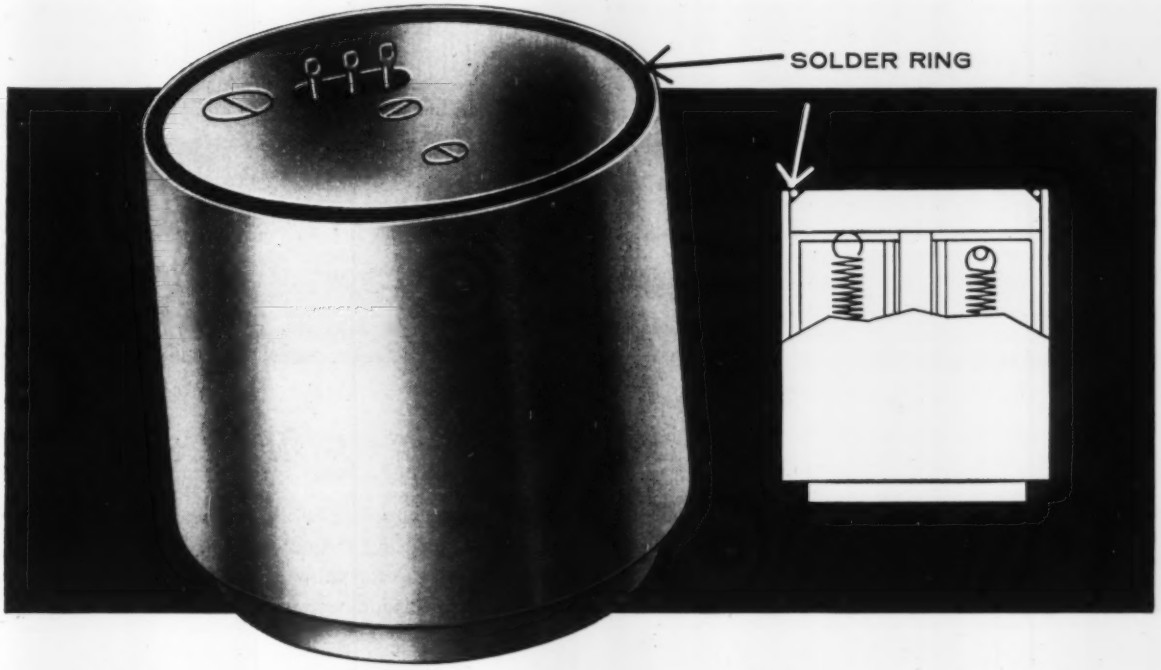

When G. M. Giannini and Co., Inc., Pasadena, California, switched from old-fashioned methods to TOCCO Induction Heating they increased production of these high-precision accelerometers from 4 to 30 per hour—with a commensurate *decrease* in production costs.

Here's what a Giannini official has to say about the TOCCO installation: "Prior to using TOCCO for this purpose, we had tried soldering irons, normal torches, resistance sealing, and even threaded screw fittings, with uniformly poor results. Essentially, the TOCCO unit has permitted us to build, in production quantities, oil-filled hermetically sealed units that could not be produced in any other way."

Whether your production bottleneck involves soldering, brazing, heat treating or heating for forming it pays you to investigate TOCCO as an economical way to do it better, faster and at lower cost.

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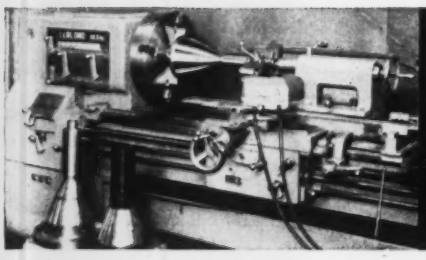
PRECISION:

Reason enough to buy LeBlond

In Hartford, Conn., Delta Corp. chucks a 350 lb. forging of 347 stainless in its tracer-equipped, 24″ LeBlond Regal Lathe. Delta is a specialist in precision sheet metal weldments and exacting machining jobs. When this job comes off the Regal it will be a contoured tube weighing only 18 lb. Its walls will vary in thickness from $\frac{1}{8}$″ to $\frac{1}{16}$″ according to a rigid and complex pattern. Wall thickness will be held to ±.003″; ID to —.001 +.000; OD to ±.008; and finish will be 20 to 30 rms. If the job is run 3 or 30 times, the same precise result will be achieved—reason enough to buy a LeBlond.

You never hesitate to put this kind of work on a LeBlond Lathe. You know that the sturdiness, the horsepower, the precision is there when you need it. It's what you'd expect from the world's largest builder of a complete line of lathes (and of tracers for lathes, too.)



THE R. K. LeBLOND MACHINE TOOL COMPANY
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LeBLOND *of Cincinnati*

STEEL
Servicenter

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

November 16, 1959

You Can Beat-the-Experts

Here's your chance to outexpert Detroit's experts.

All you do is guesstimate the number of passenger cars that will be built in the U. S. during the first six months of calendar 1960. The six readers who come the closest to the actual production figure will be the winners.

The No. 1 expert will have his choice of any of the 19 cars built by the Ford Div. to use as his own for 14 days. His selection will be made from one of six series: Fairlane, Fairlane 500, Galaxie, Station Wagon, Thunderbird, or the Falcon. He will have 60 days after contest results are published to pick up and use the car. It will be made available through the Ford outlet nearest his home.

The five next best guessers will win signed color prints of a dream car prepared by Virgil Exner, vice president and director of styling, Chrysler Corp. In future columns, you'll be reading more about Mr. Exner's thinking on the engineering features that could be incorporated in the car.

Detroit's experts are predicting that automobile production in U. S. plants will range from 5.7 million to 6.7 million for the entire year. We talked with STEEL's Detroit Editor Don Postma and he optimistically predicts 6,680,000. You can divide any of those figures by two and come up with a good guess for first half production. Remember, though, motordom traditionally builds about 55 per cent of its cars in the first half of a production year. A hint: The last winner in our Beat-the-Experts contest was within 296 units of the actual production figure, so use a seven digit figure—3,456,789, for example.

Ward's Automotive Reports' preliminary production figures will be the final authority. We're using preliminary figures because they'll be available by mid-July, so the winners can be announced as soon as possible.

You'll find an entry blank in this column every week until the contest closes. Facsimiles are acceptable, but only one entry per man is permitted. Deadline: Entries must be postmarked before midnight, Dec. 31, 1959. Anyone, except employees of The Penton Publishing Co., may enter.

In case of ties, the earliest postmark will determine the winner. So sharpen your pencils, complete the coupon, clip it, and mail it in.

A second contest, in which you'll predict production for the full year will start next May.

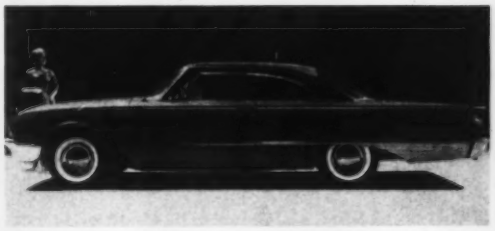
Results of the second half of our first Beat-the-Experts contest, in which 832 readers predicted U. S. automobile production for all of 1959, will be announced early in 1960. The winner will receive a 1/10 scale model of General Motors' Firebird III, and runners-up will win color prints of

Yours to Drive for Two Weeks

● ***A Thunderbird . . .***

● ***Or a Falcon . . .***

● ***Perhaps a Starliner . . .***

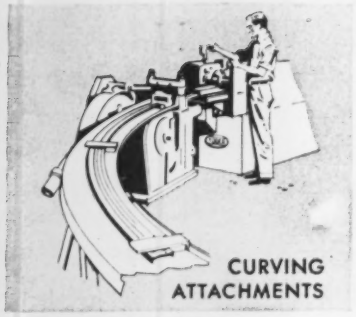


● ***Or any other of the Ford Div. line.***

I believe _____ automobiles will be produced in the U. S. from Jan. 1 through June 30, 1960.

Mail this to:
Beat-the-Experts
STEEL
Penton Bldg.
Cleveland 13,
Ohio

PRINT NAME _____
POSITION _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____



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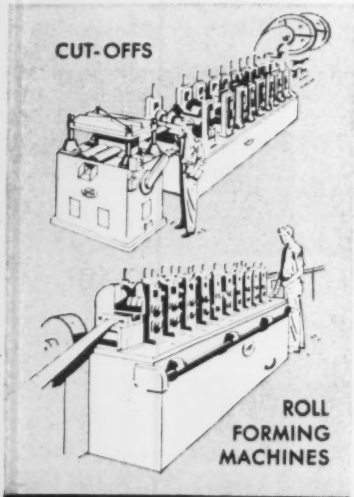

ENGINEERING YODER MANUFACTURING
COLD ROLL
FORMING
MACHINES

a dream car rendered by George W. Walker, Ford vice president and director of styling.

Plug Your Ears

November and December promise to be explosive months in STEEL. Next week, Associate Editor Ross Whitehead will tell you how "Cones Can Be Shaped Explosively." It's a simple trick using sheet metal discs and cone shaped dies, says Ross.

We have a number of similar stories in the works. Machine Tool Editor Bob Huber toured the western states and found out what aircraft companies are doing with explosives. He also found differing opinions on what explosives can do. Safety, kinds of explosives, and effects of explosives came in for a hard look by users. However, all agree that it's a great new field and does things you can't do any other way.

It seems no one knows how many companies are using explosive forming nor what they're forming. If you can or do use explosive forming in your company, we'd like to hear about it. We'll let you know how we make out.

Caught in a Bind

L. J. Morton, business manager, Superior Welding & Press Repair Co., Detroit, tells us he's an inveterate article clipper, but the fine quality of our binding makes it difficult to remove pages. His most recent problem was with the Oct. 26 Metal Selector and it caused him to suggest that we perforate each sheet near the binding to facilitate removal.

We'll sure consider it, Mr. Morton. In the meantime, anyone who wants a free copy of the Selector can get one by writing to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Executives at Work and Play

Ever wonder where the time goes? A study of 5000 businessmen by the *Harvard Business Review* and the Twentieth Century Fund can give you an inkling. They investigated how much leisure an executive has and what he does with it—as well as what he would do with more leisure if he had it.

Compare yourself with our first report on the study:

Executives spend 66.8 hours per week at work: 42.7 at the office, 6.8 at home doing paperwork, 2.6 in business entertaining, 5.3 traveling between home and office, 2.8 in business-social functions outside home, and 6.6 in business travel.

His leisure activities consume 35 hours: 2.4 at civic and political functions; 5.2 at literary and cultural activities; 21.8 in hobbies, sports, and relaxing; 3.5 in study to further career; and 2.1 in church activities.

More next week.

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We would like to discuss application of automated presses to your production requirements. For the complete story, phone or write Mr. R. E. Sanford, Erie Foundry Company, Erie 2, Pa.

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BISHOP Tubular Products NEWS

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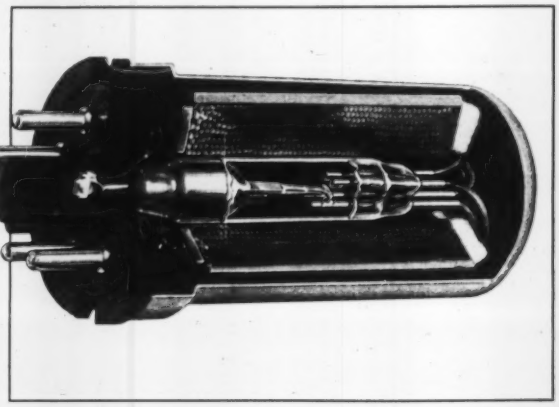
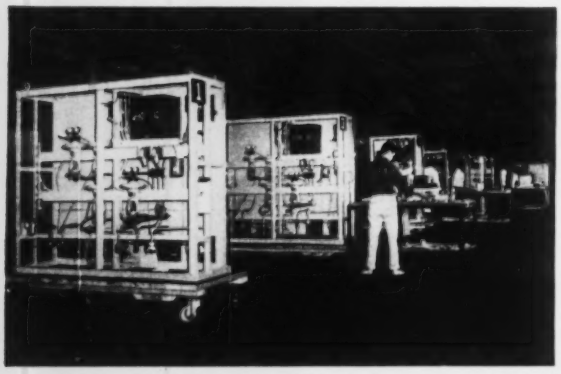
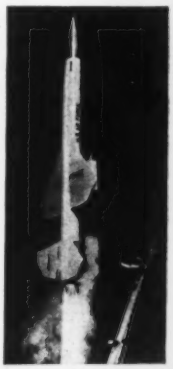


TUBING TAKES 5,400 PSI IN HONEYWELL'S MISSILE CHARGING SYSTEM



Super pressure stainless steel tubing connects many components of the cubicles illustrated. Minneapolis-Honeywell's Missile Equipment Division, Pottstown, Penna. builds these control cubicles that make up the gas charging system for the Bomarc missile. BISHOP supplies Honeywell with two sizes of 304 seamless super pressure tubing for this application. During charging of the missile, tubing handles pressures up to 5,400 psi. If you use small diameter tubing—super pressure, commercial quality or other—consider BISHOP. Use the coupon for a copy of BISHOP's Tubular Products Bulletin.



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platinum works

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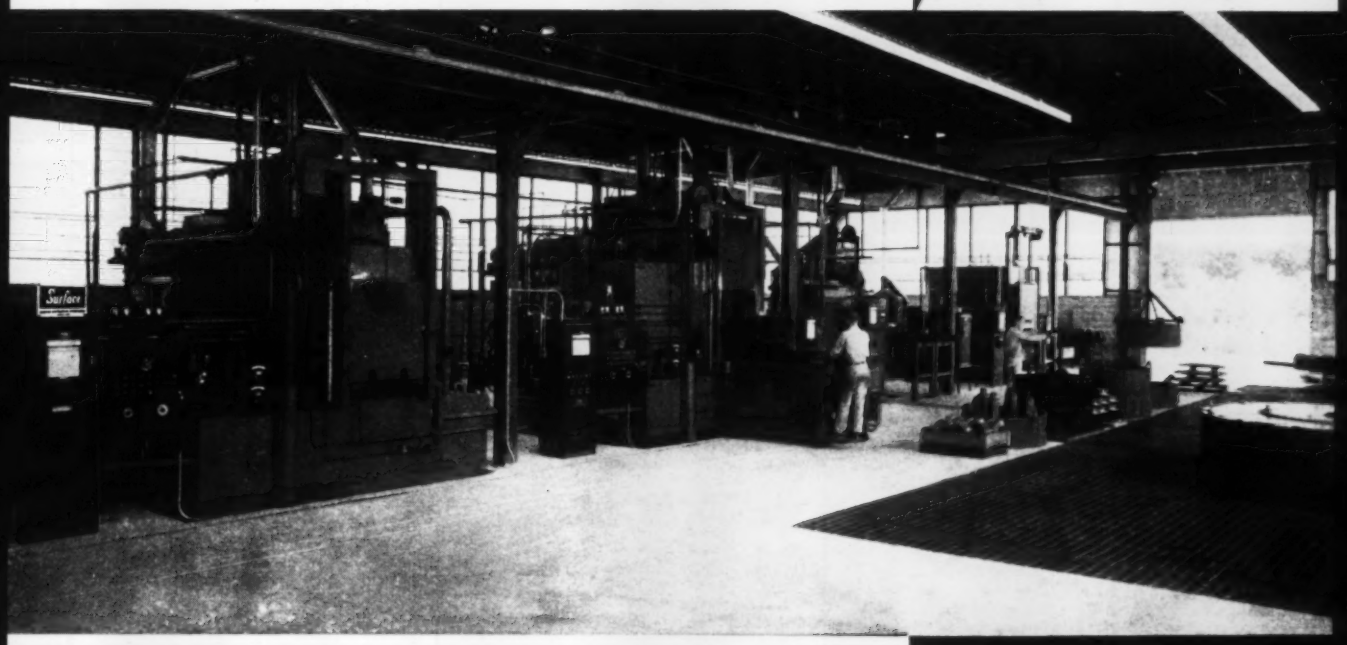

Exceptional uniformity and speed of heat treating, regardless of load density, help make a consistent profit-maker of this mechanized line of Surface batch-type furnaces at The Milwaukee Gear Company.

Because of Surface Power Convection, Milwaukee Gear has much greater metallurgical control and uniformity of product than ever before. High-velocity wind penetrates the tightest loads; assures uniform heat transfer whatever the size, shape, or alloy of the work.

Carburizing case depths are hit right on the button which vary from a few thousandths to 5/16 of an inch. This unusually flexible standard rated furnace line consists of two Super Allcase® furnaces, a horizontal draw furnace, spray washer, DX® and RX® gas generators, and Autocarb® signalling dewpoint controller.

Surface Power Convection cuts cycle times to a fraction.

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CALENDAR
OF MEETINGS

Nov. 17-20, Packaging Machinery Manufacturers Institute Show: Coliseum, New York. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

Nov. 19, National Industrial Conference Board: Meeting for all associates, Conrad Hilton Hotel, Chicago. Board's address 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Nov. 23-25, American Management Association: Research and development conference, Ambassador Hotel, Los Angeles. Association's address: 1515 Broadway, New York 36, N. Y.

Nov. 29-Dec. 3, American Institute of Steel Construction: Annual meeting, Boca Raton Hotel, Boca Raton, Fla. Institute's address: 101 Park Ave., New York 17, N. Y. Executive vice president: L. Abbett Post.

Nov. 29-Dec. 4, American Society of Mechanical Engineers: Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Nov. 30-Dec. 4, Exposition of Chemical Industries: Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Dec. 2, Electric Overhead Crane Institute Inc.: Annual meeting, Carlton House, Pittsburgh, Pa. Institute's address: 1 Thomas Circle, Washington 5, D. C. Executive Secretary: Joe H. Peritz.

Dec. 2-4, Metallurgical Society of AIME: Electric furnace steel conference, Sheraton-Cleveland Hotel, Cleveland. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Dec. 2-4, National Association of Manufacturers: Congress of American Industry, Waldorf-Astoria Hotel, New York. Association's address: 2 E. 48th St., New York 17, N. Y. Executive vice president: Charles R. Sligh Jr.

Dec. 4-6, National Federation of Independent Scrap Yard Dealers Inc.: Convention, Plaza Hotel, New York. Federation's address: 29 Broadway, New York 6, N. Y. Counsel: Morris Rosoff.

Dec. 6-9, Drop Forging Association: Winter meeting, Savoy-Hilton Hotel, New York. Association's address: Public Square Bldg., Cleveland 13, Ohio. Executive vice president: Dwight M. Allgood.

Dec. 6-10, American Institute of Chemical Engineers: Annual meeting, Sheraton-Palace Hotel, San Francisco, Calif. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

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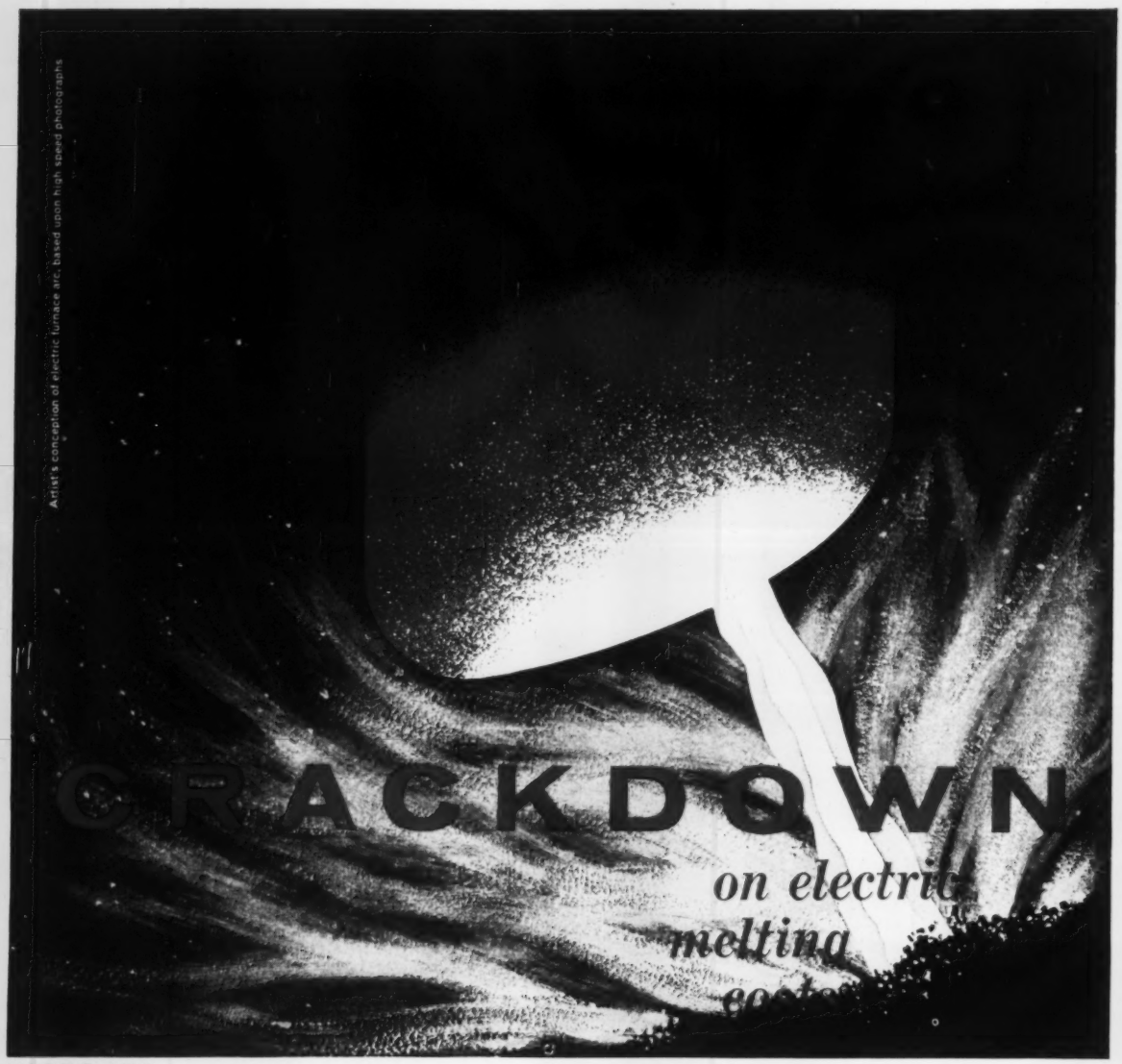

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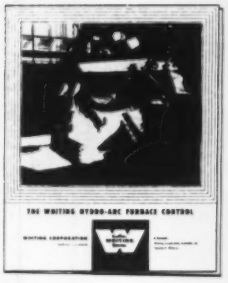

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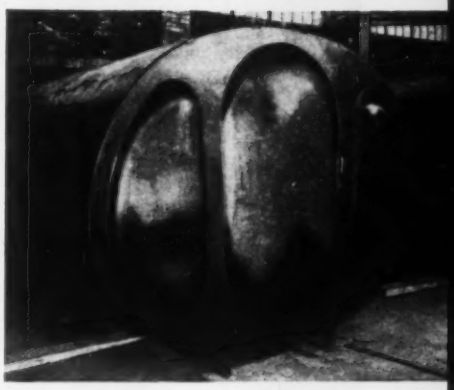

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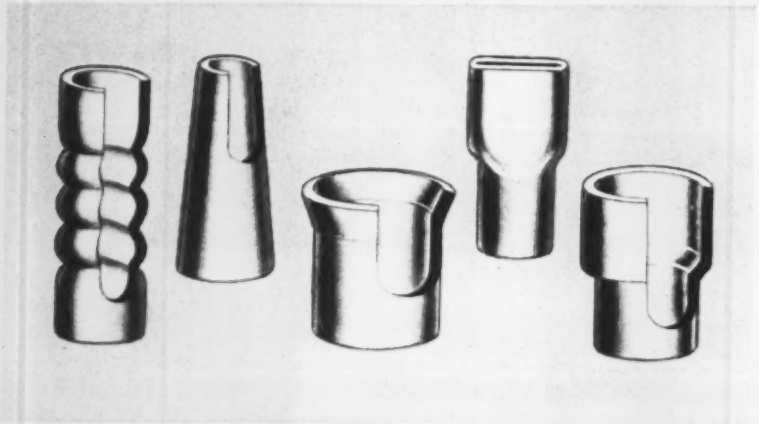

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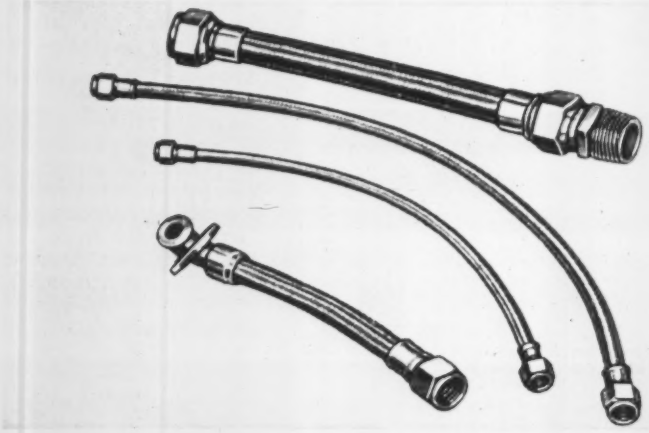

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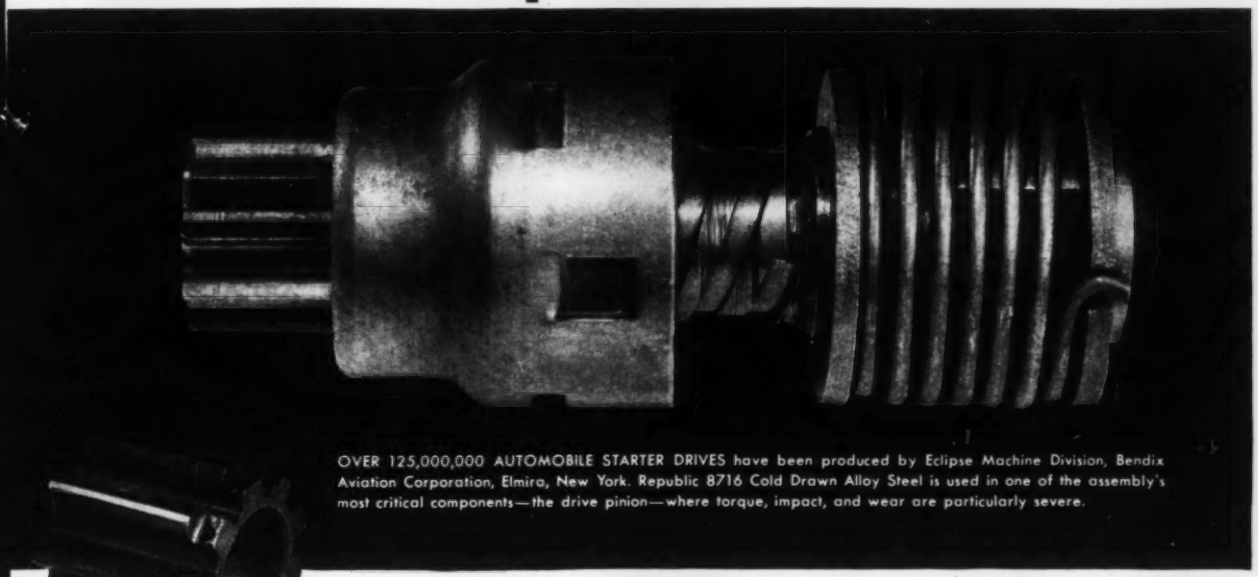

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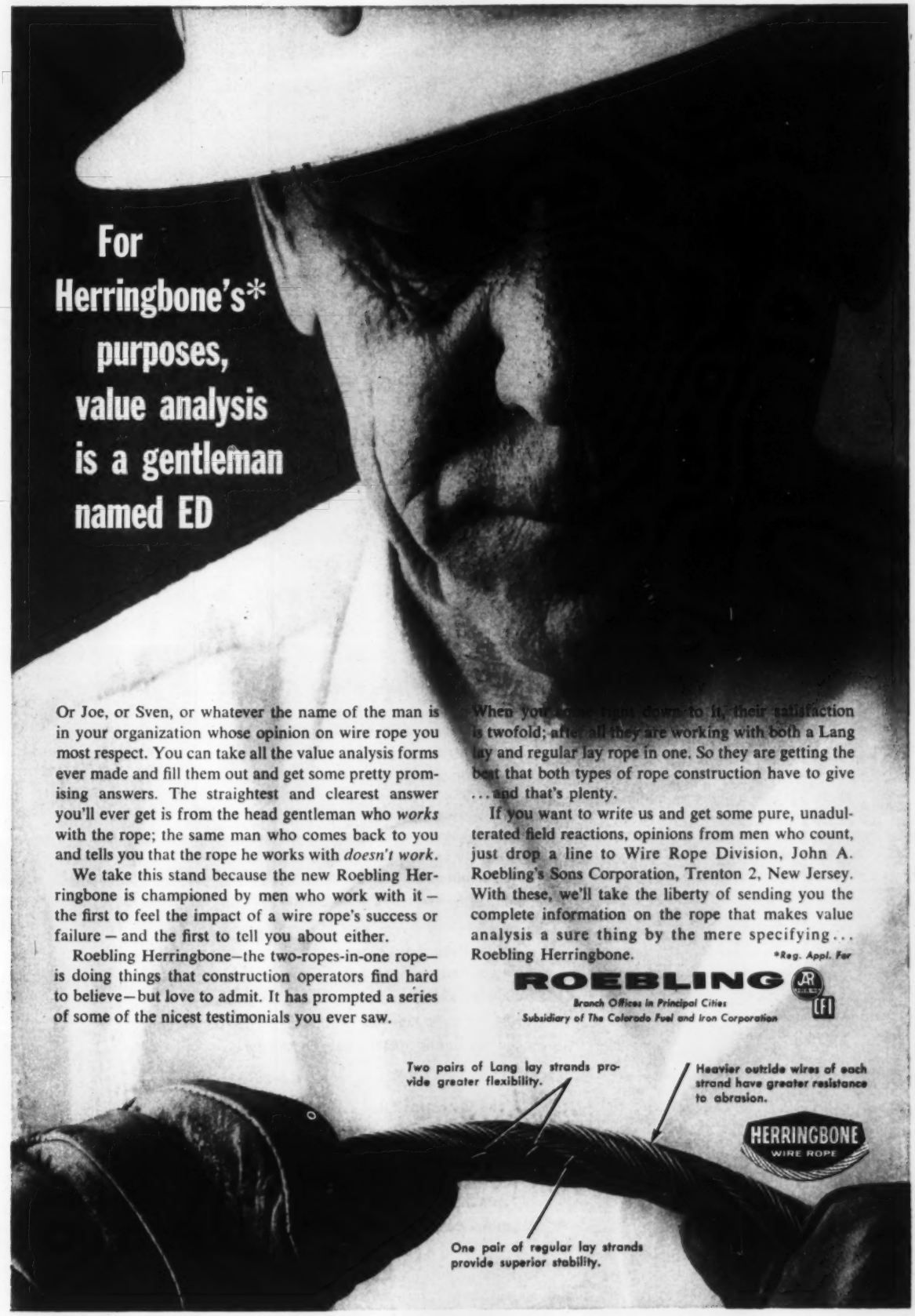

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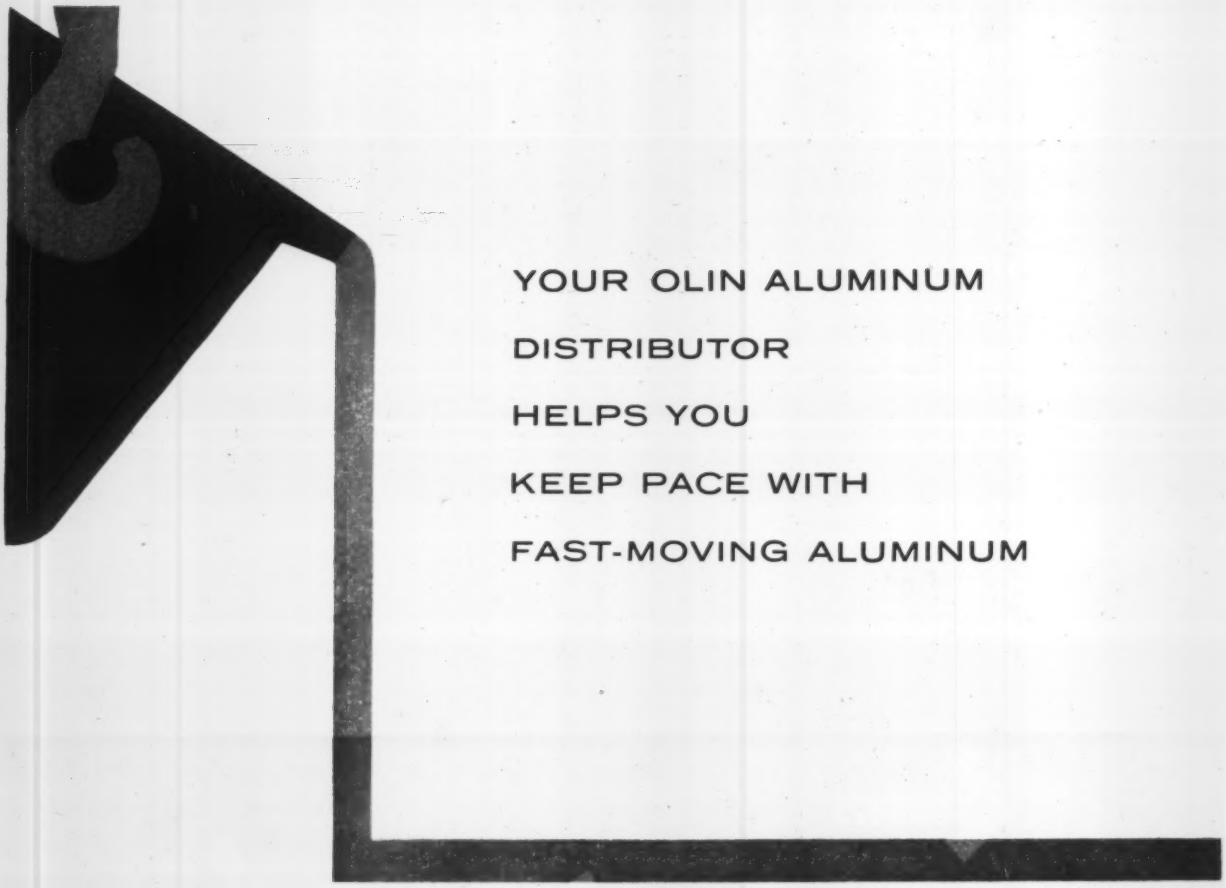

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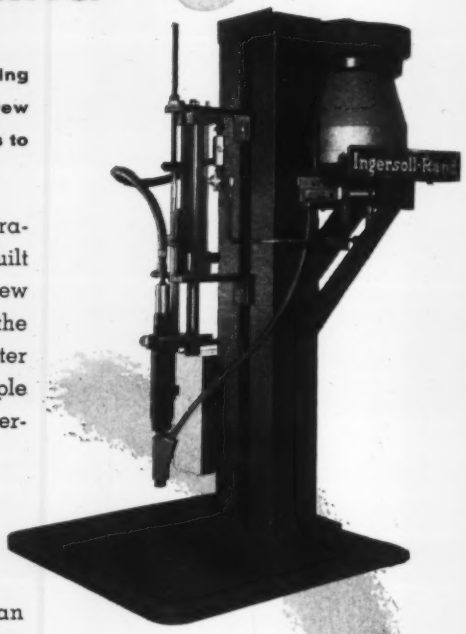

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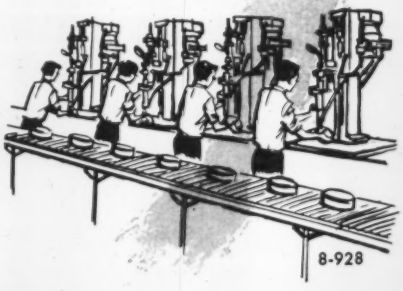

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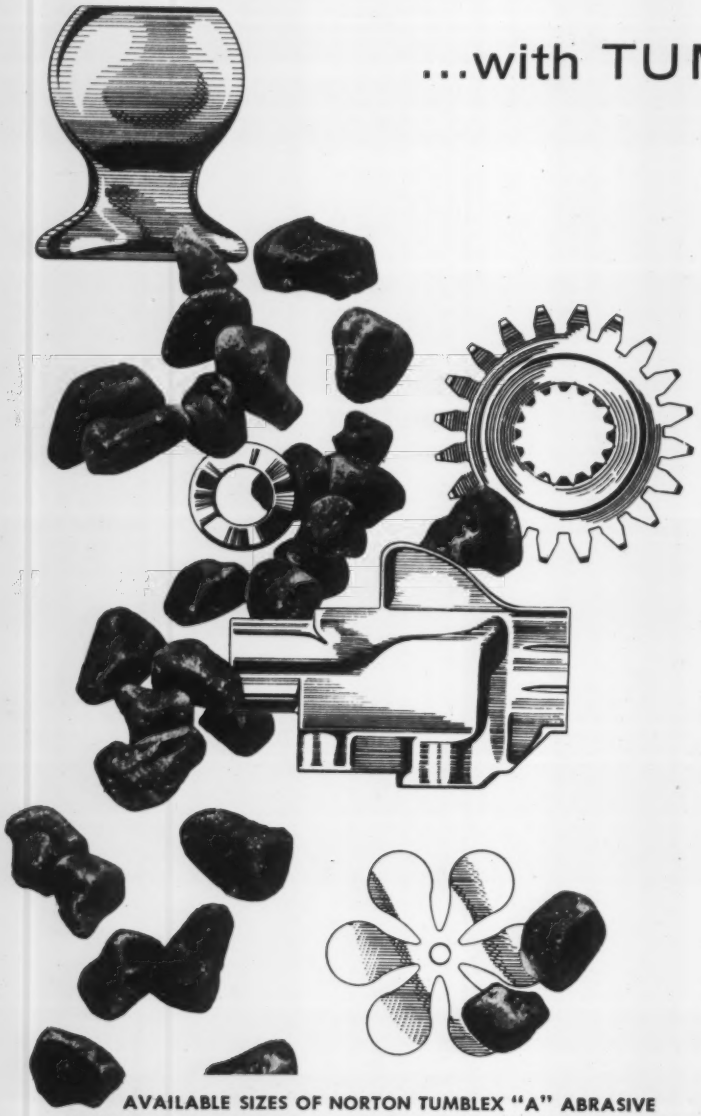


Norton TUMBLEX "A" abrasive gives barrel finishing the "Touch of Gold" advantages, the *fast* way to a *better* finish on your parts. This high production tumbling abrasive of Norton ALUNDUM* aluminum oxide forms radii and finishes to your required microinch reading while removing flash, scale, tool marks, and burrs at high production rates.

Available in a range of fourteen sizes, Norton TUMBLEX "A" abrasive is capable of providing excellent cut and finish on a *wide* variety of work pieces. It will not glaze, but instead will maintain a continuous high rate of cut.

Let our Sample Processing Department show you a better way of finishing. Send us unfinished samples and one finished piece. We will barrel finish samples with TUMBLEX "A" abrasive — or with one of the other Norton TUMBLEX abrasives if more suitable. Our return report will tell you exactly how you can improve product quality while cutting finishing time and costs. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

AVAILABLE SIZES OF NORTON TUMBLEX "A" ABRASIVE

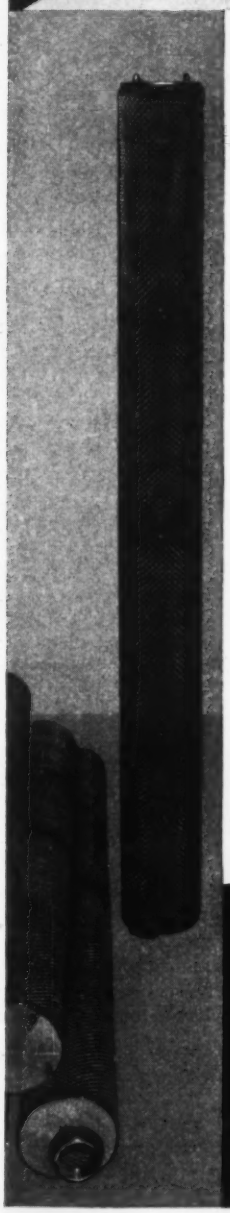
No.	Size	No.	Size
00	1½" to 2"	3½	5/16" to 3/8"
0	1⅛" to 1½"	4	1/32" to 5/16"
1	⅞" to 1⅛"	5	3/16" to ¼"
1½	11/16" to ⅞"	6	⅛" to 3/16"
2	9/16" to ¾"	8	1/32" to ⅛"
2½	½" to 9/16"	10	standard 10 mesh
3	3/8" to ½"	12	standard 12 mesh

NORTON ABRASIVES

G-378

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



Who cares about your Wire Cloth Fabrications?

CAMBRIDGE does . . .

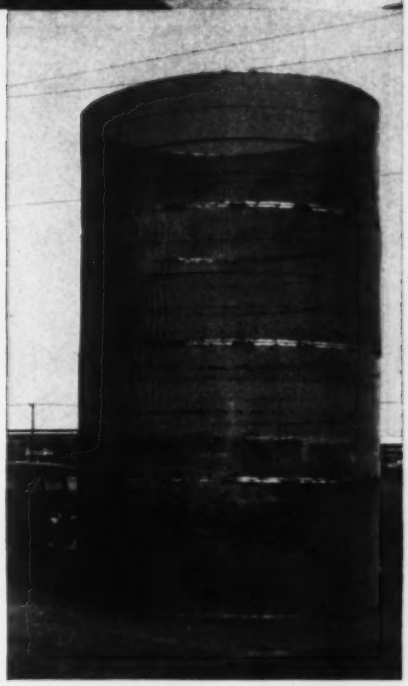
that's why you automatically get service with your order . . . whether you need dozens of midget strainers or a single giant-sized retaining screen.

Careful, competent workmanship and constant inspection assure you of quality . . . modern machinery and accurate scheduling assure you of prompt delivery. And, a Cambridge Field Engineer follows up your order to make sure our product is giving you the best possible service. Let us quote on your next order for wire cloth fabrications. We manufacture wire cloth from any metal or alloy—including titanium—in nine basic weaves. We'll work from your prints or draw up prints for your approval. Call your Cambridge Field Engineer . . . he's listed in the yellow pages under "Wire Cloth". Or, write for FREE 94-PAGE CATALOG.

The Cambridge Wire Cloth Co.

Department J • Cambridge 11, Md.

Manufacturers of Wire Cloth, Metal-Mesh Conveyor Belts, Wire Cloth Fabrications

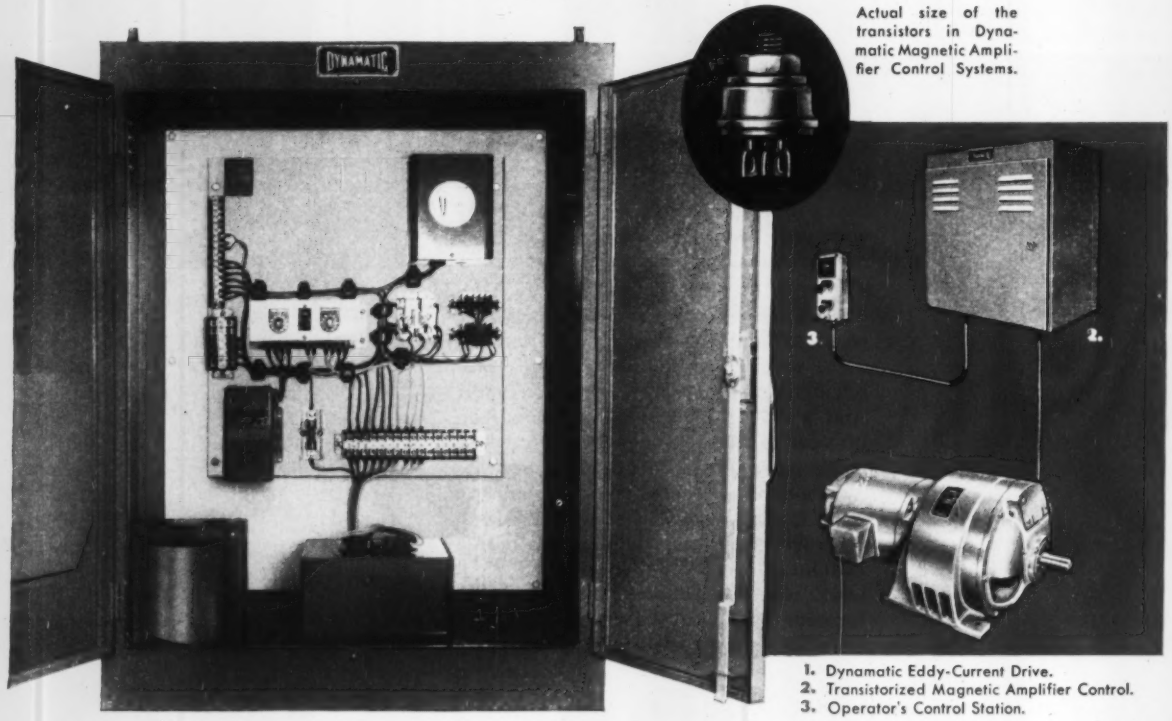


NEW RELIABILITY!

DYNAMATIC®

MAGNETIC AMPLIFIER (TRANSISTORIZED) CONTROL SYSTEMS

for Eddy-Current Rotating Equipment



Actual size of the transistors in Dynamatic Magnetic Amplifier Control Systems.

1. Dynamatic Eddy-Current Drive.
2. Transistorized Magnetic Amplifier Control.
3. Operator's Control Station.

DYNAMATIC Transistorized Magnetic Amplifier Control Systems are based on a new principle using rugged electrical components designed to provide many times the life of components used in electronic speed control systems. Transistors, reactors, and silicon rectifiers take the place of vacuum tubes; there are no wearing parts to require maintenance, adjustment, or replacement. These transistorized controls are ideal for installation in remote areas and for unattended operation.

Used in combination with Dynamatic Eddy-Current Drives, Transistorized Magnetic Amplifier Controls provide infinite speed adjustment and accurate control for almost any application from five through 10,000 horsepower. Three essential components—drive, push-button station, and magnetic amplifier control—make up the Dynamatic Drive Package, which operates on alternating current. Standard control features include constant speed regulation, infinite speed adjustment, on-off clutch control, and jogging. Special features may be easily added to standard controls to meet the requirements of individual applications.

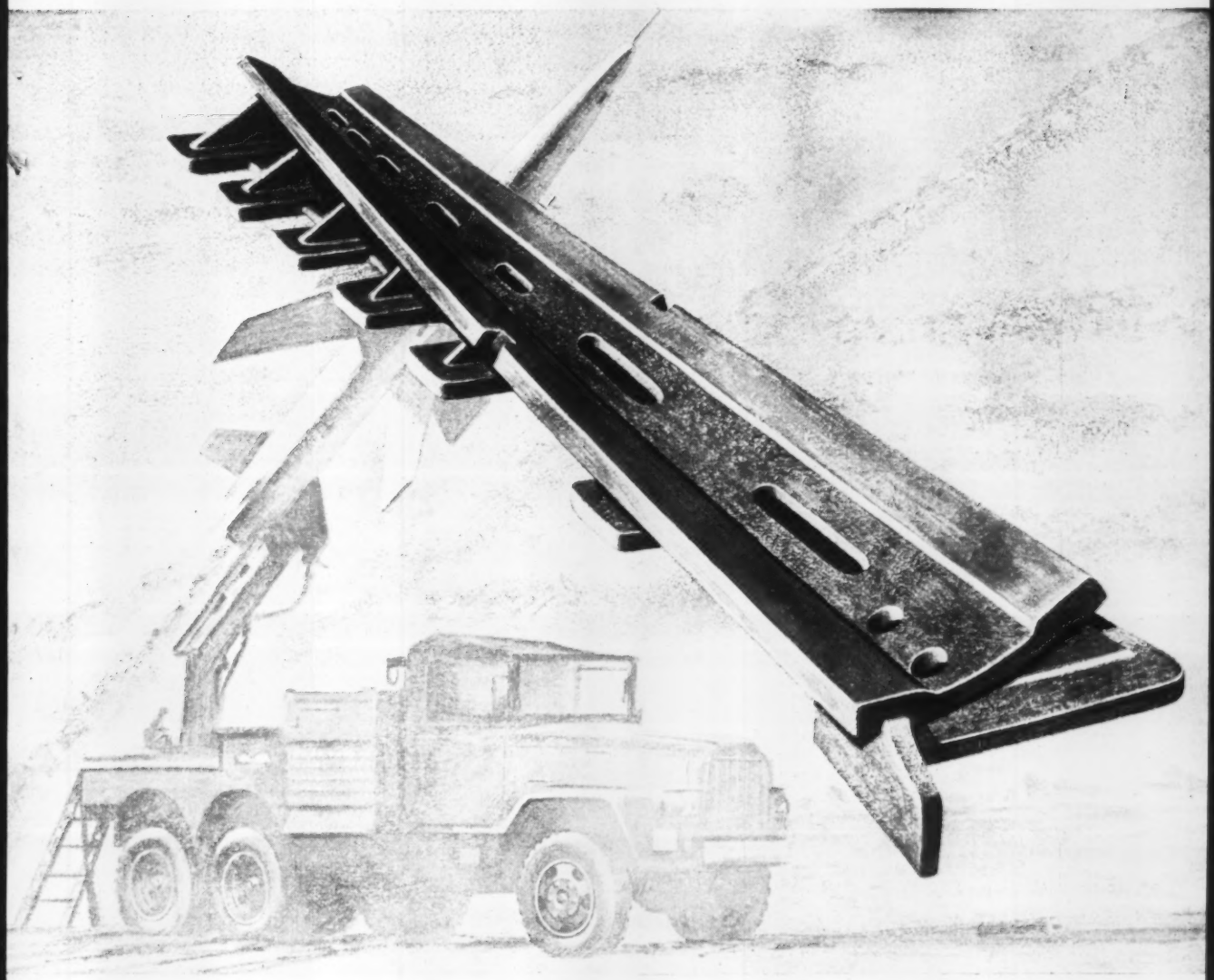
Dynamatic Transistorized Magnetic Amplifier Control Systems provide a high degree of accuracy and versatility—and are practically maintenance-free.

Send for New Illustrated Bulletin Describing Circuitry, Construction, and Operation.

EATON

DYNAMATIC DIVISION
MANUFACTURING COMPANY
3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

How the Foundry Industry serves America . . . #1 of a Series



IRON CASTING REDUCES COST OF MISSILE LAUNCHER TRACK BY 41%

This important contribution to the guided missile industry was accomplished by replacing the nine independent parts formerly used with one integral high-strength iron casting. Not only was a substantial saving effected, but the cast iron track with its much greater dimensional stability assured the exact alignment so vital to successful missile launching.

This is a typical example of the improved performance at lower cost that can be achieved by incorporating modern iron castings into sound, modern industrial design.

Hanna is proud to be part of this great industry and will continue to provide foundries with all regular grades of pig iron . . . foundry, malleable, Bessemer, intermediate low phosphorus, as well as HANNATITE® and Hanna Silvery . . . in the same high quality and to the same high standards that have made Hanna the best known name in iron.

HANNA
THE BEST KNOWN NAME IN IRON

THE HANNA FURNACE CORPORATION
Buffalo • Detroit • New York • Philadelphia
Merchant Pig Iron Division of National Steel Corp.

Facts from files of Gray Iron Founders Society

In 1946 J. Gordon Lippincott and Walter Margulies began what has proved to be one of the nation's most successful industrial design firms. Here their firm has chosen the new, exciting patterns of Sharonart* as the material for their advanced design room air conditioners.

Eliminating the conventional box-like unit Lippincott & Margulies have taken advantage of the principle of thermoelectric refrigeration and the beauty of Sharonart* to design units that are both attractive and functional. Fans, housed in the base or back of these units, force air over the cooling elements and circulate it throughout the room. Housings of perforated and painted or plated Sharonart* give the units added beauty while practically eliminating wear.

Tomorrow's room air conditioners designed by Lippincott and Margulies with *

Patterned Steel

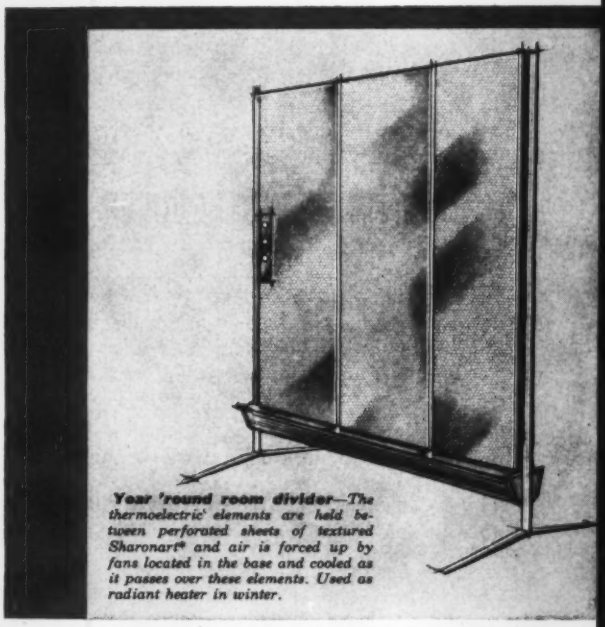
Sharonart* . . . the greatest advance in design steels in a decade . . . brings unequalled versatility to product engineers. Virtually any pattern can be rolled into one or both surfaces of stainless or carbon steels. It can then be fabricated as easily as plain steel . . . perforated, drawn, roll formed, stamped with few limitations. It can be painted, plated or coated by standard methods.

Here's new beauty, new style for your product without expensive retooling. Here's the ideal material for wear areas for most Sharonart* patterns hide scratches, fingermarks, etc.

Sharonart* is available in big production coils in a wide range of gauges and widths. Get the complete story, write for literature today.

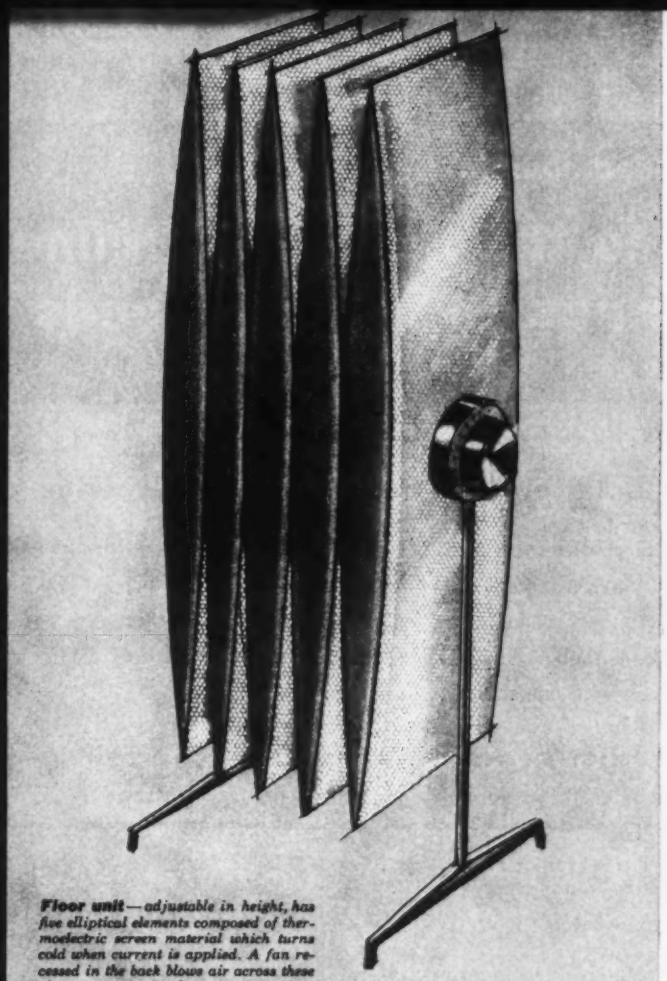
Sharon Steel Corporation, Sharon, Pa.

*TM



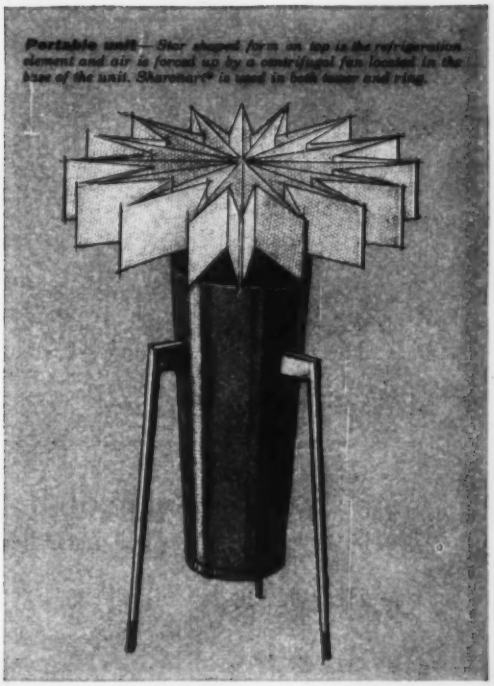
Year 'round room divider—*The thermoelectric elements are held between perforated sheets of textured Sharonart* and air is forced up by fans located in the base and cooled as it passes over these elements. Used as radiant heater in winter.*

SHARONSTEEL **SHARON** *Quality* **STEEL**



Floor unit—*adjustable in height, has five elliptical elements composed of thermoelectric screen material which turns cold when current is applied. A fan recessed in the back blows air across these elements and circulates it throughout the room. Housing of Sharonart® reduces wear, adds beauty.*

Portable unit—*Star shaped fan on top is the refrigeration element and air is forced up by a centrifugal fan located in the base of the unit. Sharonart® is used in both fan and ring.*



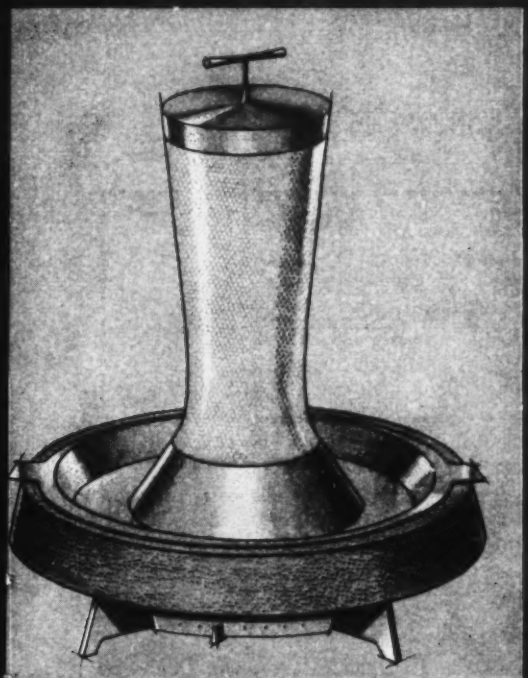
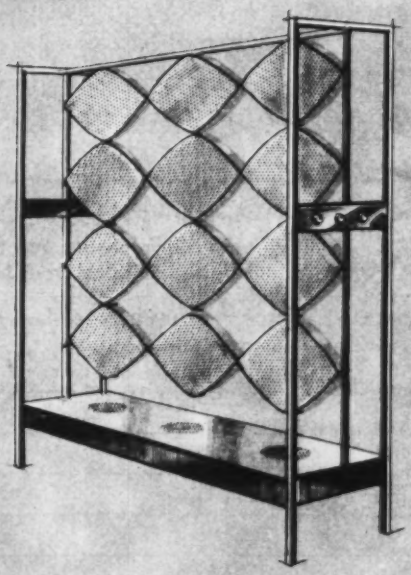


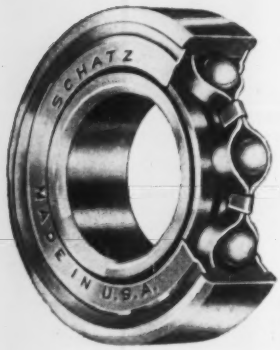
Table unit—*The upper half is made up of a thermoelectric element and air is blown up and through by a centrifugal fan mounted in the base. A removable pan is provided to collect any moisture which may form on the sides. Fins and base of contrasting patterns of Sharonart®.*



Decorative room divider—*Perforated Sharonart® provides unlimited design possibilities for large room units. Thermoelectric units are contained in perforated Sharonart® housings, fans in base of harmonizing Sharonart® pattern.*

Name your load and speed combinations...

Schatz makes the most varied line of Ball Bearings to fit your needs



"Functional Precision" Ball Bearings—BR series

One piece race type with ball cage. Designed to give all the precision you require under certain ratios of load, speed and life expectancy. Available in open type, single or double shielded, single or double sealed with Schatz patented low friction plastic seal. Or with one shield and one seal on special order.

23 sizes from 3/16" to 1"—6 types in each size + specials

"Commercial" Ball Bearings

The most complete and varied line anywhere.

UNGROUND BALL BEARINGS "TYPE A"—Every standard type—radial, thrust and radial thrust.

GROUND BALL BEARINGS "TYPE B"—Used and recommended where greater accuracy and smoother running qualities are needed and where loads are heavier and speeds higher.

1033 sizes to match your Bearing Application Needs

FILL IN AND MAIL

We'll fit these bearings—or special types and sizes to your special needs. Just fill in your application problem below—attach to your letterhead and mail.

THE SCHATZ MANUFACTURING COMPANY, Poughkeepsie, N. Y.

Here's our bearing problem. What do you suggest?

APPLICATION_____

LOAD (radial, thrust or both)_____

SIZE_____

SPEED_____

LIFE FACTOR_____

OPERATING CONDITIONS_____

SPECIAL CONDITION_____

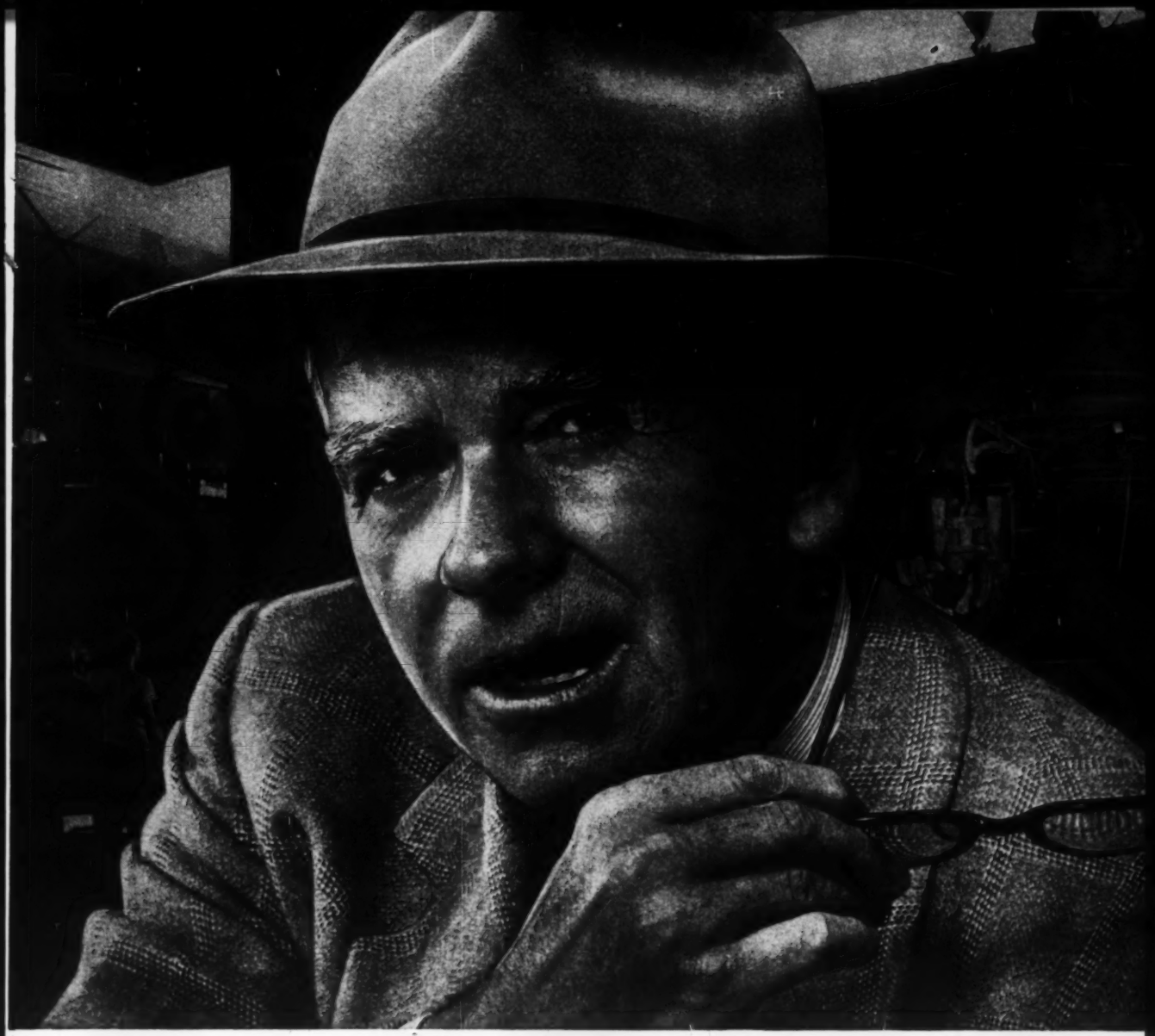
Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

SCHATZ
BALL BEARINGS



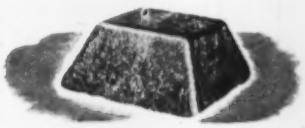
"I stock only one high-carbon chrome—refined chrome"

Steel mill and foundry operators are cutting chromium costs by using the new ELECTROMET refined chrome for all high-carbon chromium additions. Inventory, handling, and storage are greatly simplified by stocking only this one high-carbon chromium alloy. It is ideal for use as:

- **A base charge for stainless steels.**
- **Final additions for aircraft, bearing, and tool steels.**
- **Cupola or ladle additions for cast iron.**

Refined chrome combines the economy of regular charge chrome with the maximum cleanliness and low residual element content of conventional high-carbon ferrochrome. For facts on how refined chrome can reduce your costs, contact your UNION CARBIDE METALS representative.

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.



Convenient 20- and 40-pound pigs of refined chrome are magnetic, allowing easy handling with an electromagnet.

UNION CARBIDE METALS

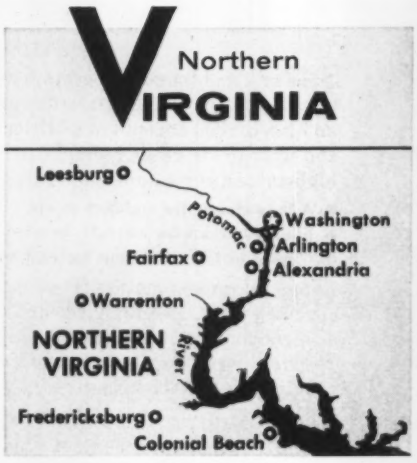
***Electromet** Brand Ferroalloys and other Metallurgical Products*

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

You can see Washington Monument from our new lab...

There couldn't be a righter spot than Northern Virginia for your new research center, pharmaceutical plant or other light industry. It's close to the facilities of the Nation's Capital. And skill runs high among a population with an educational level 30% above the U. S. average.

Vepco knows this area intimately. Because Vepco serves it with dependable and abundant electric power . . . 1,700,000 kilowatts of capability now, due to exceed 2,000,000 kilowatts by 1961. For more facts, or confidential site-finding help in this land of mild climate and pleasant living, write or phone today.



50 years
1909-1959

VIRGINIA ELECTRIC and POWER COMPANY

Serving the Top-of-the-South . . . in Virginia, West Virginia and North Carolina

Clark P. Spellman, Mgr., Area Development, Electric Bldg., Richmond 9, Va., MI 9-1411

MOLYKOTE®

LUBRICANT

metalworking news

PUNCH LIFE INCREASED FROM 2,000 to 25,000 HOLES IN STEEL PLATE

These punches (11/16") were used to punch 25000 holes in ½", 1020 cold rolled steel plate. Without MOLYKOTE Lubricants a maximum life of only 2000 holes could be obtained.

A West Coast manufacturer was experiencing low punch life with the best conventional lubricants. Their multiple punching operation consisted of cold shearing 50 holes simultaneously in a single steel plate. A maximum life of 2,000 holes per punch was obtained with ordinary lubricants.

Then, MOLYKOTE Type G was applied to the punch occasionally. The result: punch life was increased from 2,000 to 25,000 holes which afforded substantial savings.

When writing, refer to Item 508

"A LITTLE BOTTLE FOR A BIG JOB"

- For Extending Die Life.
- For Preventing Metal Pickup.

Try it . . . Order a 10 ounce container of MOLYKOTE Type Z TODAY!

When writing, refer to Item 507

MOLYKOTE CANNOT BE SQUEEZED OUT REGARDLESS OF PRESSURES; EXCELS AS COLD-FORMING LUBRICANT IN METALWORKING

Distortion, Stick-Slip and Fretting Eliminated • Mounting Loads Reduced • Chatter and Noise Avoided • Allows Easier Disassembly

In metal forming the most difficult problem to overcome is scuffing from metal pickup on the dies. Direct contact of bare surfaces of a piece undergoing formation with the die often results in galling, scuffing, etc. If the surfaces can be separated by a lubricant of sufficient film strength, metal pickup does not occur.

Before new dies are used, burnish them with MOLYKOTE Type Z. If the lubricant you are now using does not have sufficient film strength and galling does occur, use MOLYKOTE on your dies.

The automobile industry which forms and fabricates vast tonnages of various metals, uses MOLYKOTE Type Z extensively.

When writing, refer to Item 505

Applying MOLYKOTE Lubricant to feed stock at the Bassick Company, Bridgeport, Conn., in a forming operation.

DAMAGE DUE TO IMPROPER MACHINERY "WEAR-IN" CAN BE ELIMINATED WITH NEW COMPOUND

Wear-in damage is often serious enough to require costly reconditioning of new equipment and if the damage is not repaired, it will interfere with and reduce the useful service life of expensive machinery. During this critical wear-in period, damage due to galling, scoring, tearing, scratching, excessive abrasion and seizing is an inherent hazard. MOLYKOTE WEAR-IN COMPOUND is the most effective lubricant yet developed to combat this damage.

In seven different ways, MOLYKOTE WEAR-IN COMPOUND saves you time and money:

1. **Shortens "wear-in" period without use of abrasives.**
2. **Reduces galling, seizing and excessive wear during the critical "wear-in" period in new or rebuilt machinery and after the installation of replacement parts.**
3. **Offers the best safeguard against costly reconditioning work and shipping delays due to the "breaking-in" of new machinery.**
4. **Eliminates "stick-slip" behavior and resists galling and seizing at bearing pressures far beyond the yield point of any metal.**
5. **Specifically designed for "wear-in" use. MoS_2 particles make intimate contact with bearing surfaces. Will not scrape off.**
6. **Need not be burnished into surface. Brush or wipe on a thin coating.**
7. **Inexpensive . . . a little goes a long way.**

When writing, refer to Item 506

Address your letter to The Alpha-Molykote Corp., 65 Harvard Ave., Stamford, Conn.
Phone: FIreside 8-3724.

SEE OUR CATALOG IN SWEET'S OR WRITE FOR COPY

THE ALPHA-MOLYKOTE CORP.
Stamford, Connecticut
Please send me details on

Item 505 ☐ Item 507 ☐
Item 506 ☐ Item 508 ☐

Name .....
Company .....
Address .....
City .....
State .....

THE ALPHA-MOLYKOTE CORPORATION

BREAKING LUBRICATION BARRIERS

. . . THROUGH RESEARCH

GISHOLT

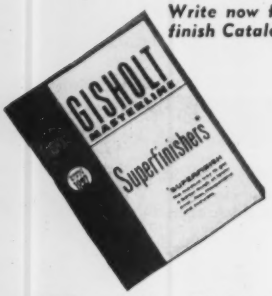
do you have OIL SEAL TROUBLES?

SUPERFINISH can solve them!

Here's a typical case where a shaft with ground surfaces was driven at a speed of 1750 r.p.m. The oil seals created enough heat to burn the shaft and stop the motor. To make matters worse, it was found that twice the original speed was necessary. So, the oil seal surfaces were *Superfinished,* and the shaft operated at a speed of 3500 r.p.m. With the *Superfinished* surfaces, no heat was developed at this higher speed. No further trouble was encountered.

Superfinishing is a quick, simple and inexpensive process. Oil seal surfaces are but one of the many applications where it can save you money. Not only can it eliminate trouble, but often it can help you reduce manufacturing costs. Gisholt engineers can advise you regarding its applications.

Write now for new Superfinish Catalog No. 1169-B



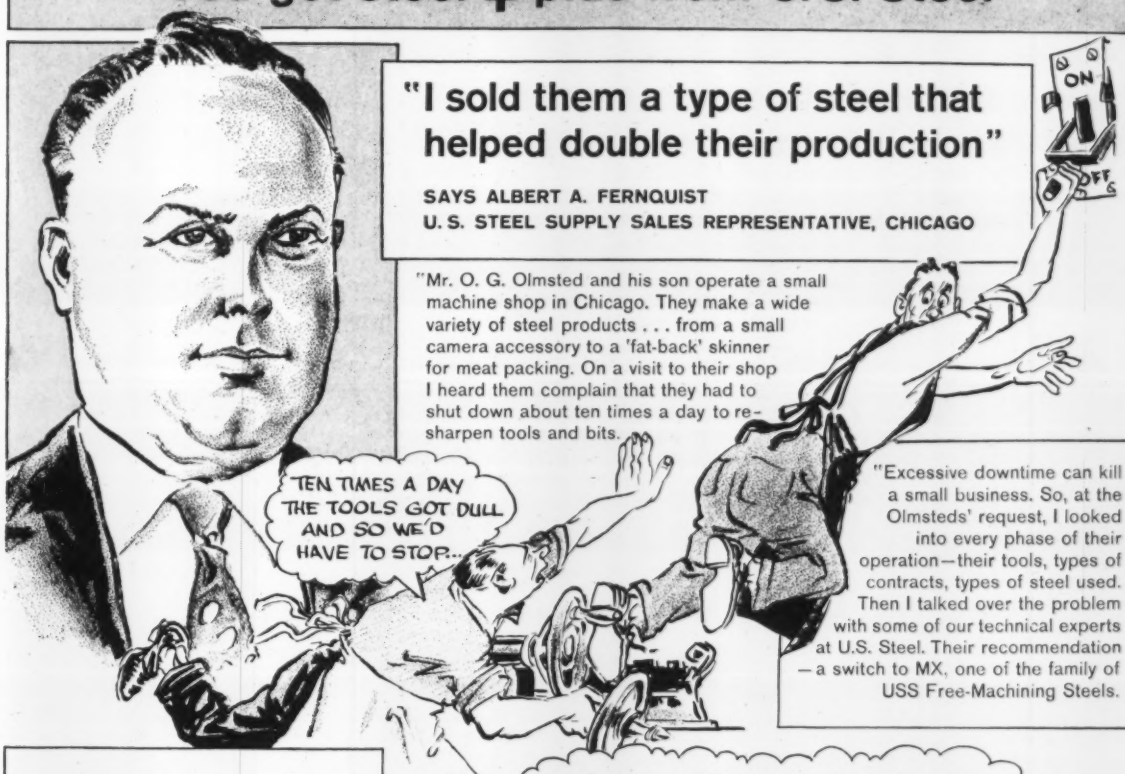
GISHOLT MACHINE COMPANY

MASTERLINE GISHOLT SINCE 1887 GISHOLT

Madison 10, Wisconsin

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY-REBUILT MACHINES WITH NEW MACHINE GUARANTEE

You get steel + plus from U.S. Steel



"I sold them a type of steel that helped double their production"

SAYS ALBERT A. FERNQUIST
U. S. STEEL SUPPLY SALES REPRESENTATIVE, CHICAGO

"Mr. O. G. Olmsted and his son operate a small machine shop in Chicago. They make a wide variety of steel products . . . from a small camera accessory to a 'fat-back' skinner for meat packing. On a visit to their shop I heard them complain that they had to shut down about ten times a day to re-sharpen tools and bits.

"Excessive downtime can kill a small business. So, at the Olmsteds' request, I looked into every phase of their operation—their tools, types of contracts, types of steel used. Then I talked over the problem with some of our technical experts at U.S. Steel. Their recommendation —a switch to MX, one of the family of USS Free-Machining Steels.

"Today, 98% of the steel the Olmsteds buy is MX, and because of its better machineability, tools only have to be resharpened once every two days. Olmsted production has doubled—for which they give MX a good share of credit—and tool life has been increased 500%!

"It's a help to have the full facilities of U.S. Steel behind you when you're dealing with fine customers like the Olmsteds."

When you buy from U.S. Steel you get steel plus technical assistance . . . research . . . facilities . . . marketing assistance.

USS and MX are registered trademarks

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

USS

In how many ways did oil help make your life better today?

From the industrial world to the insect world, oil's span of helpfulness is almost without limit. Besides lubricating and powering the wheels and gears of mill, farm and factory machinery, products of petroleum kill insects, destroy weeds, preserve metals, make surface coatings perform better.

Everywhere you look you'll find oil at work, in many cases put to work by the Penola Oil Company. Penola products are backed by the nation's largest petroleum research and refining facilities . . . sold by one of the oldest marketers in the United States.

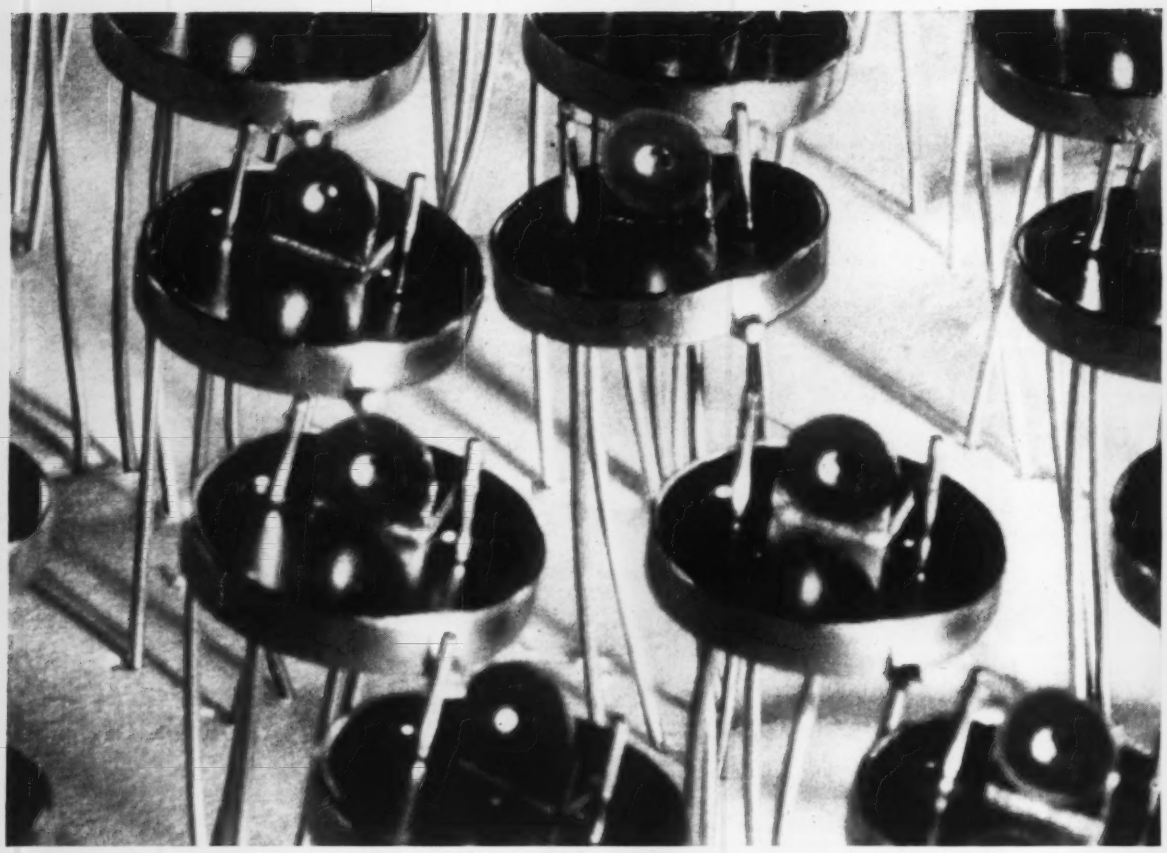
The Penola Oil Company offers a complete line of superior products — including oils used in the production of steel ingots shown here. Each product tailor-made for a specific job plays an important role in helping to cut manufacturing costs and improving product performance . . . in making America a more pleasant and rewarding place in which to live.

Write to the nearest Penola office for information on any of these products:

WAXES (for milk and food paper cartons)
NAPHTHAS (for insecticides and herbicides)
WHITE OILS (for drugs and cosmetics)
UNIFLO MOTOR OIL (for automobiles)
FLIT (for killing household insects)
SOLVENTS (for paints, chemicals, and solvent extraction)
GREASES AND LUBRICANTS (for industrial and automotive uses)

Penola

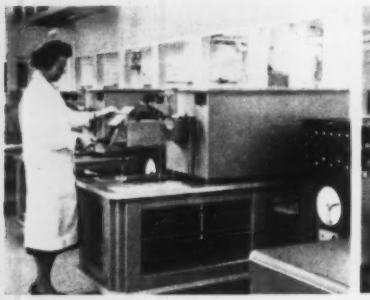
PENOLA OIL COMPANY 15 WEST 51ST STREET, NEW YORK, N. Y. • DETROIT • CHICAGO

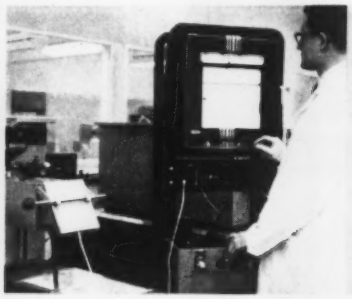


IBM, Poughkeepsie, N. Y.: Critical alloying and bonding temperatures determine final operating characteristics of germanium transistors (above).

Alloying and bonding temperatures a problem?

Not at IBM, Poughkeepsie, N. Y., where Speedomax® H is helping alloy the "dots" and bond the "whiskers" in the manufacture of transistors for their data processing equipment. The right alloy and proper bond depend upon temperature . . . determine transistor operating characteristics. At IBM, Speedomax H is holding these critical temperatures to within 2 degrees F . . . reproducing desired processing conditions, again and again. Rugged, compact and thoroughly reliable, this modern controller is providing equally dependable control for many other heat treating processes . . . helping to produce both process economies and a quality product. *Whatever your heat treat, it'll pay you to investigate Speedomax H! For details, contact your nearest L&N office or write 4957 Stenton Ave., Phila. 44, Pa.*

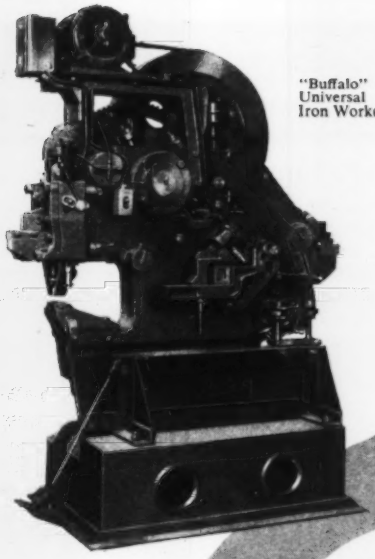




LEEDS Instruments **NORTHRUP** Automatic Controls • Furnaces

Operator loads CM furnace with tray of germanium wafers. Routine check with traveling thermocouple and Speedomax Type G AZAR recorder proves Speedomax H holds temperature gradient of soak zone to within 2 F.

"6-in-1" Machine Pays for Itself—Fast!

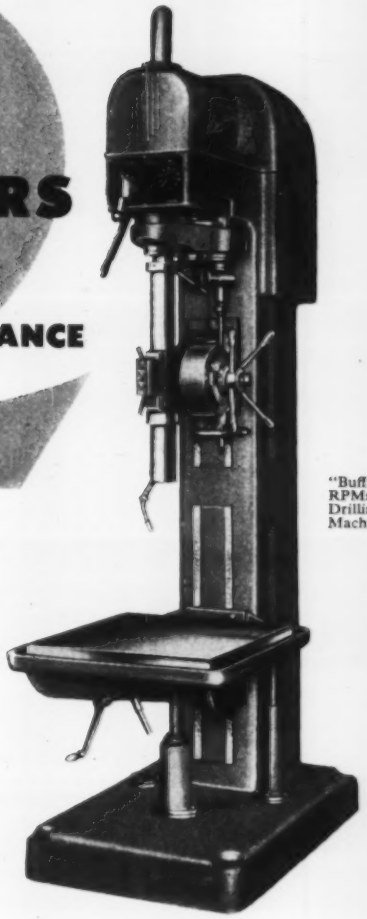


"Buffalo" Universal Iron Worker

For production shops, or for those with maintenance work, the "Buffalo" Universal Iron Worker takes the space of only **one** machine (and requires only a **one**-machine investment) yet it does the work of **six** machines. It's a great space-, time-, work- and money-saver. The UIW rapidly notches, punches, shears, miters, slits, cuts, copes. It handles angles, tees, channels, bars and flats at fast production rates. Performs up to three jobs at once, thus saving time and labor. Ruggedly built with heavy welded steel frame for dependable service. See how the "Buffalo" Universal Iron Worker can save money for you! Write for Bulletin 360-G.

2 MONEY-MAKERS

FOR PRODUCTION OR PLANT MAINTENANCE



"Buffalo" RPMster Drilling Machine

Drilling Speed Changes Unlimited!

Since "Buffalo" pioneered the "RPMster" it has earned an industry-wide reputation as the outstanding variable speed drilling machine. Now, new improvements make this versatile drill even more productive and profitable to use. One is the exclusive "Buffalo" Torque Controlled Power Feed. This permits maximum speed and feed for the size hole being drilled without concern over damage to drill or machine gearing. The "RPMster" has been redesigned for greater capacities, ranging from 1" to 2" in mild steel. For a revelation in drilling ease, smoothness and high productivity, be sure to investigate the "Buffalo" RPMster. Write for Bulletin 3257-B.

For complete facts on these "money-making machines", call your "Buffalo" machine tool dealer. Or write us direct.

ESTABLISHED 1877 Buffalo MEMBER NMTBA

BUFFALO FORGE COMPANY

158 Mortimer St. • Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

A COMPLETELY *NEW* SERIES!

Lodge & Shipley PRESS BRAKES

WILL *YOUR* NEW BRAKE HAVE ALL THESE FEATURES AT LODGE & SHIPLEY'S LOW *STANDARD* PRICE?

NEW... Pitman Assembly redesigned for long life with little maintenance

EXCLUSIVE . . . Combination Air Clutch and Mechanical Brake

NEW . . . Wedge Ram Pressure Release, improved exclusive design

NEW... Quad-lateral Ram Slide Bearing, full-length, full-time

NEW... Ready-Pivot Ram Adjustment for out-of-parallel operations

NEW . . . Dovetail, Double Rocker Bed-Mounting on solid steel housing

NEW... "Long Operation" standard controls for versatile operation

PROVED . . . One-piece, heat-treated, machined and ground Eccentric Shafts

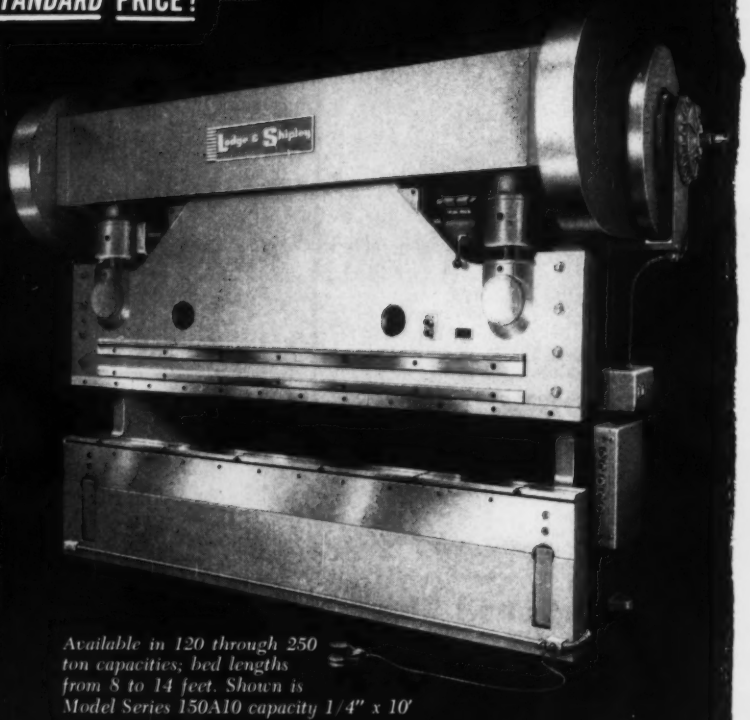
NEW... Micro-Fog, oil bath and grease Lubrication System

PROVED . . Two full bearings on each eccentric shaft

NEW . . . Sectional die clamps on ram nose open automatically

NEW... Stroke Position Indicator shows top and bottom dead center

NEW . . . optional Two-Speed Transmission can be field-installed



Available in 120 through 250 ton capacities; bed lengths from 8 to 14 feet. Shown is Model Series 150A10 capacity 1/4" x 10'

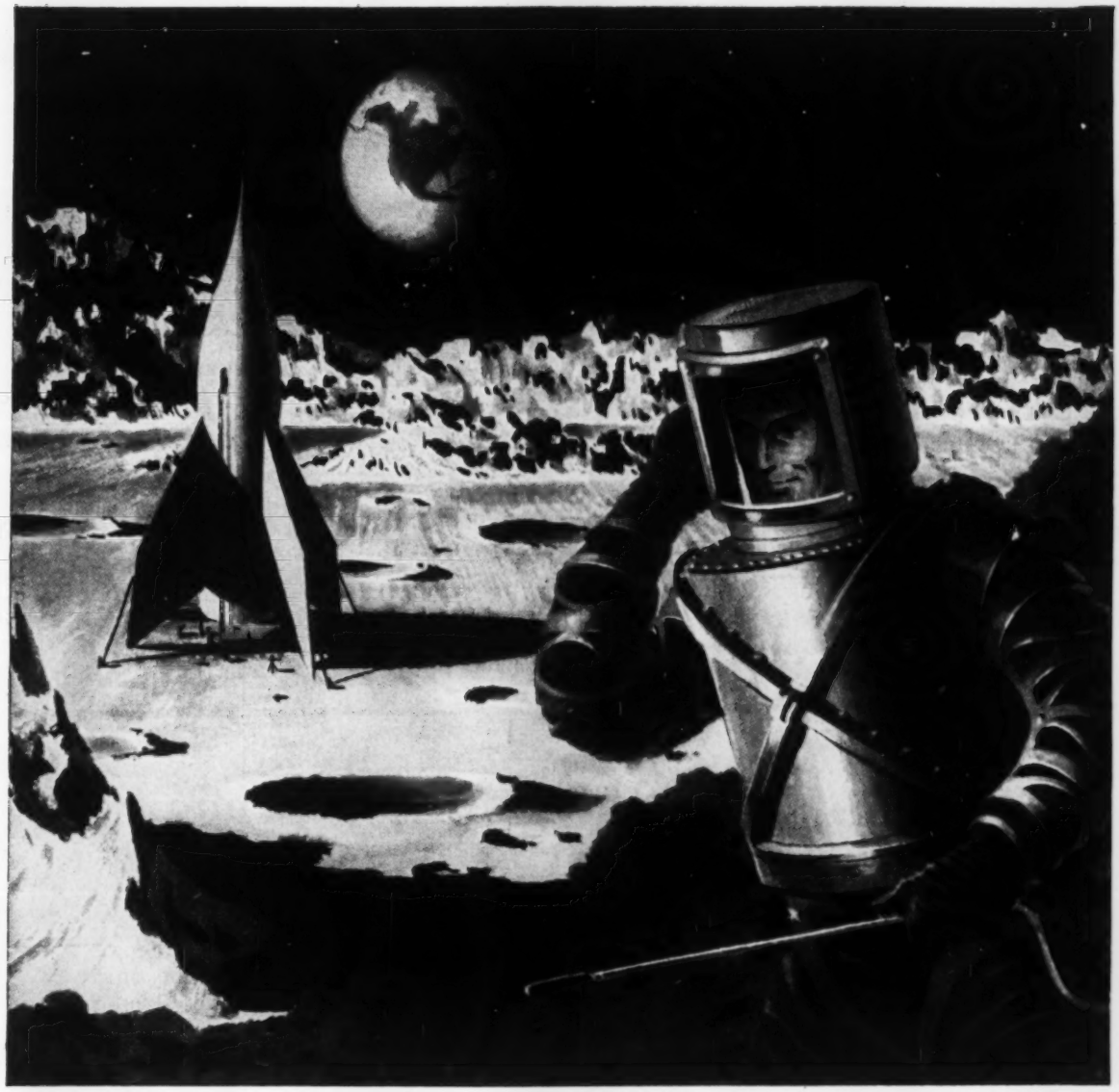
New and completely redesigned, Lodge & Shipley Power Press Brakes offer feature after feature important to accurate, low-cost operation. Virtually every one of these advantages are included in the low base price . . . extras on the machine, but *not* on the invoice.

Space limits us to a bare listing of important new features. Request your copy of the New Condensed Press Brake Catalog today. The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio.

SEE OUR CATALOG IN SWEET'S

More than ever before, your LODGE-ical choice . . .

Lodge & Shipley



Even out there, a friendly voice

How lonely he'll be—that first man to touch the silent, ominous surface of the moon! What shred of hope would he have, were it not for that reassuring contact with home right there in his hand?

There is now no doubt that radio contact can be maintained between the Earth and our moon pioneers. The friendly voice from home will come through clear and comforting, thanks partly to improvements in electrical insulations being made today by CDF.

FOR SPECIFIC INFORMATION on any CDF insulating material, see Sweet's, Electronics Buyers Guide, and other directories. Then send us your print or your problem, and we'll recommend the proper material for your application.

CDF MAKES Dilecto Laminated Plastics • Di-Clad® laminates for printed circuits • Celoron and Polyester-Glass Molded Plastics • Micabond Mica Products • Diamond Vulcanized Fibre and Vulcoid • Flexible Tapes of Teflon†, Silicone, and Micabond.

Complete Fabrication Facilities.

†duPont trademark for its TFE-fluorocarbon resin.

CDF **CONTINENTAL-DIAMOND FIBRE**

A SUBSIDIARY OF THE Budd COMPANY • NEWARK 22, DEL.

Man's Eternal Struggle with the Machine

Will you gamble machine performance to save on engineering development?

Watch out! The trigger you've got *your* finger on could loose destruction on production schedules. Probably blow the top off your own success as well.

Obviously, special equipment takes time to conceive and design, as well as build. And, the special machine builder is in business for profit the same as your company. Therefore, his prices must include engineering development—*unless you prefer to spend that time and money in machine try-out.* In that case, don't let anybody show you how much it really cost!

Sciaky has always emphasized engineering development. That's the only way equipment can be built to do the job it was sold to do. That's why Sciaky equipment has been specified for so many demanding applications. And that's why Sciaky equipment can be installed and put into production so quickly.

Why take less than the full advantage of consulting with Sciaky Engineers on your next equipment project.

No obligation, of course.

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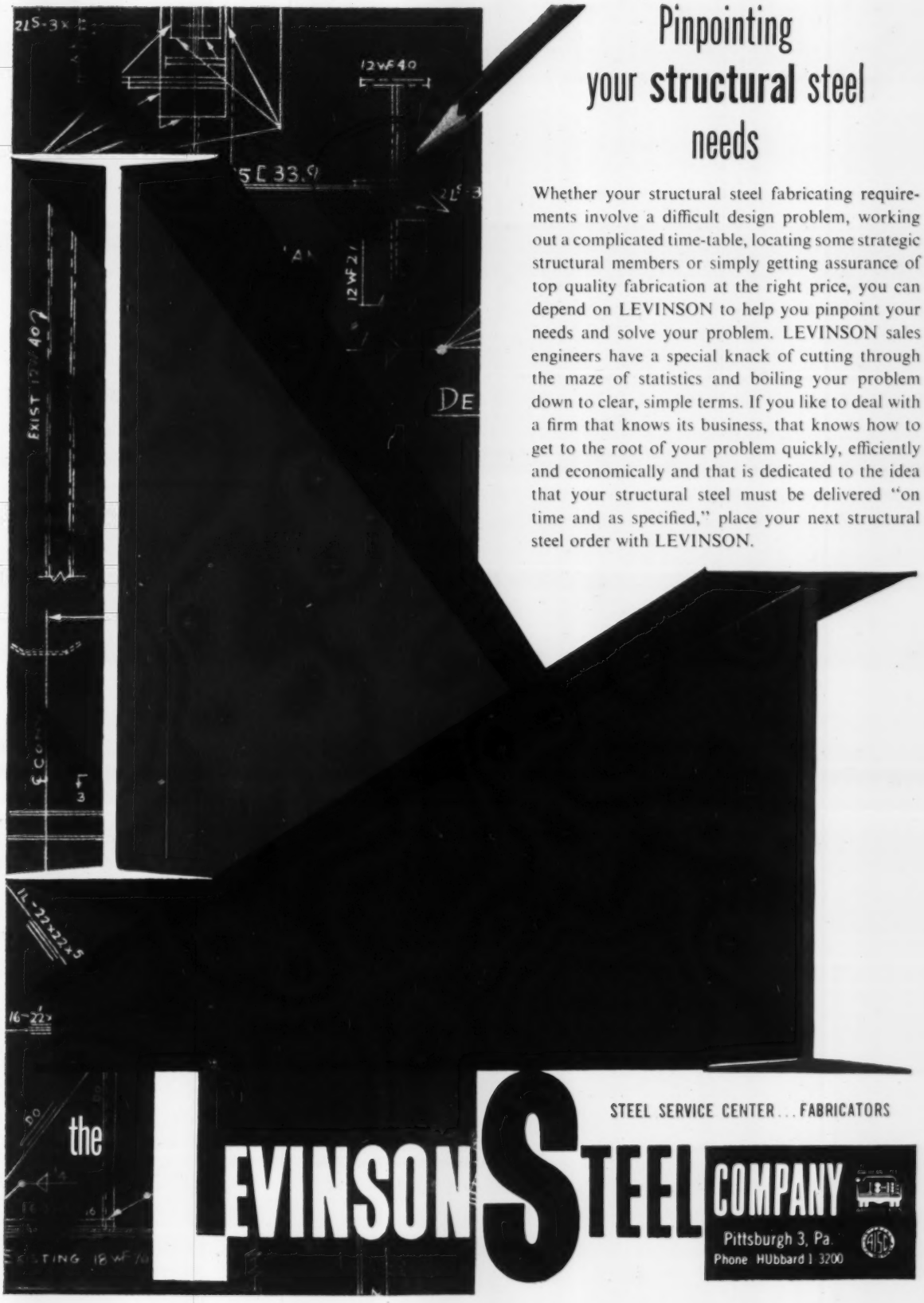
SCIAKY BROS., INC., 4909 W. 67th STREET, CHICAGO 38, ILLINOIS • POrtsmouth 7-5600



Pinpointing your **structural** steel needs

Whether your structural steel fabricating requirements involve a difficult design problem, working out a complicated time-table, locating some strategic structural members or simply getting assurance of top quality fabrication at the right price, you can depend on LEVINSON to help you pinpoint your needs and solve your problem. LEVINSON sales engineers have a special knack of cutting through the maze of statistics and boiling your problem down to clear, simple terms. If you like to deal with a firm that knows its business, that knows how to get to the root of your problem quickly, efficiently and economically and that is dedicated to the idea that your structural steel must be delivered "on time and as specified," place your next structural steel order with LEVINSON.

STEEL SERVICE CENTER... FABRICATORS

the **LEVINSON STEEL COMPANY**

Pittsburgh 3, Pa.

Phone HUbbard 1-3200

Mobilplex ep

The Multi-Service Grease with unique Calcium EP Complex. Never before in a single lubricant such a wide range of use... such a margin of superiority... such a potential for maintenance savings!

Outstanding resistance to the washing action of water, emulsions, caustics and acids is one of the many important properties of Mobil's new multi-service grease—*Mobilplex EP*. In your manufacturing plant, you'll find it protects bearings exposed to these contaminants. Mobilplex also resists heat in the range of 300 F and offers extra protection against wear under heavy loads and corrosion. It is a singularly tenacious and adhesive lubricant.

This multi-service grease has outstanding oxidation resistance as well as excellent structural and storage stability. These qualities—plus the great versatility of Mobilplex EP—make it useful throughout the plant.

Plant operators in every section of the country are finding Mobilplex EP extremely effective in extending bearing life and protecting production schedules. In addition, they're saving more than with ordinary multi-purpose greases because Mobilplex EP makes it possible to reduce application frequency, simplify storage and handling procedures.

Contact your Mobil representative for full details. He can show you results of laboratory performance tests of Mobilplex EP and five leading competitive extreme-pressure greases. You'll see why Mobilplex EP is rated tops.

MULTI-SERVICE ABILITY OF MOBILPLEX EP

ANTI-FRICTION BEARINGS (*horizontal and vertical*). Temperatures in the range of 300 F. Heavy or shock loads. Water contamination. Speeds—low, normal, high.

PLAIN BEARINGS All normal mechanical and operating conditions. Temperatures in the range of 300 F. Waterwash. Heavy or shock loads.

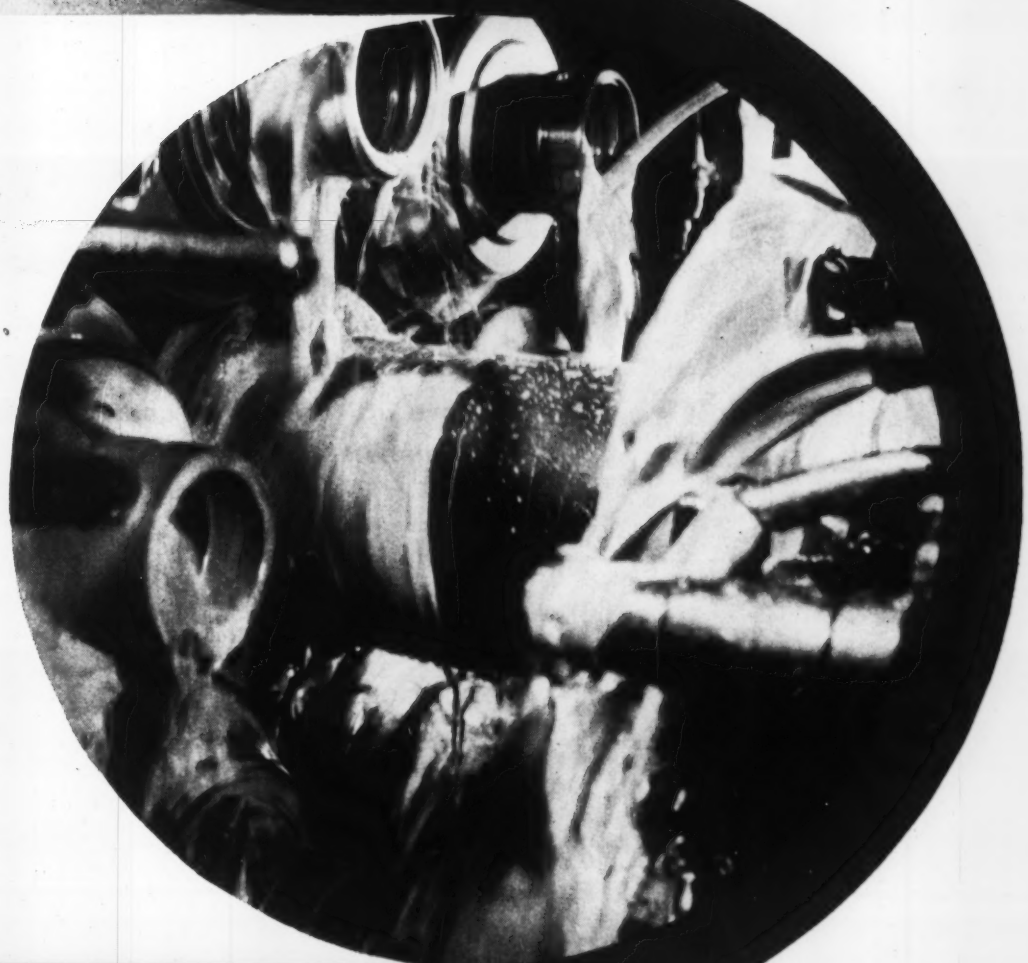
DISPENSING AND APPLICATION DEVICES Transfer pumps. Hand and power guns (*long lines*). Central greasing systems.

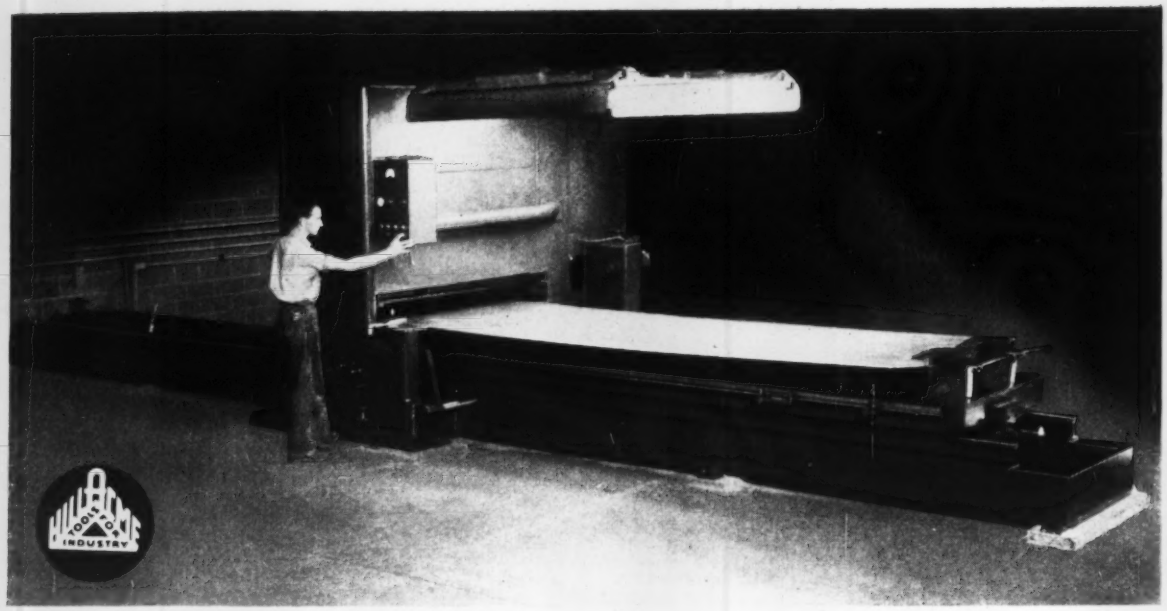
Mobil

Proved Petroleum Products... Available with a Mobil Program of Correct Lubrication

Left: Bearings packed with Mobilplex EP are unaffected by the direct washing action of water . . . rust and wear are avoided.

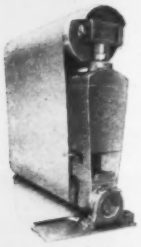
Below: Bearing surfaces subjected to the washing action of soluble oil emulsions, like the slides of this multi-spindle automatic, require less maintenance with Mobilplex EP.



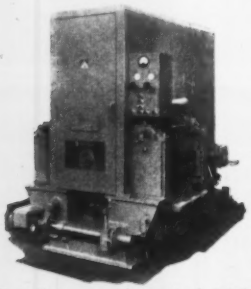


HILL Sheet and Plate polishing machine with reciprocating table and vertical 2-ROLL head.

With YOUR OWN HILL Abrasive Belt Grinding and Polishing Machine you can:



Vertical 2-ROLL HEAD. Two rolls, accurately controlled for speeds and pressures with easy adjustment for proper tension of the endless abrasive belt. A variety of grits are available.



HILL Pinch Roll type with vertical 2-ROLL head for polishing strip or single pieces. Can be used singly or in multiple units for line production.

1. Prepare the precise finish best suited to your needs.

2. Insure close inventory control of finished material.

3. Save up to half the cost of buying prepolished sheet and plate.

Increasing volume production points up the advantages of a HILL Grinding & Polishing machine in your own plant. No delay in deliveries — No premiums paid to outside sources for material that ALMOST meets requirements.

HILL 2-ROLL Vertical Abrasive Belt Grinding and Polishing machines are made in two general types for producing superior finishes on flat surfaces as required by manufacturers of decorative plastics, auto bumpers, engravers plates, home appliances, etc. Both types are built in polishing widths up to 60". Larger sizes can be furnished.

THE HILL ACME COMPANY

1209 WEST 65th STREET • • • CLEVELAND 2, OHIO

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • "ACME" FORGING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • ROTARY SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES • MATERIAL HANDLING EQUIPMENT

Crucible stainless highlights the quality in your product

This is because Crucible precision-rolls stainless to produce finishes of incomparable lustre. Not only that, Crucible methodically checks each heat to ensure uniform physical properties and accurately controls gauge with electronic measuring devices. For stainless in all gauges down to .010″ and in all strip widths, call or write: Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

CRUCIBLE STEEL COMPANY OF AMERICA

CANADIAN DISTRIBUTOR — RAILWAY AND POWER ENGINEERING CORP., LTD.

ORIGINALLY MACHINED FROM FORGED RING required
33.0 lbs of 410 STAINLESS

FLASH BUTT-WELDED FROM RECTANGULAR BAR required
23.6 lbs of 410 STAINLESS

FLASH BUTT-WELDED FROM MILL-ROLLED SECTION required only
11.5 lbs of 410 STAINLESS

Switch to flash butt-welded compressor ring saves 21.5 lbs. of material—cuts machining time

By selecting a special mill-rolled section close to finished dimensions, only 1/3 as much material was required to produce this ring. (Similar material savings could be realized on extruded sections.)

In addition, 45 minutes of expensive machining time were eliminated.

Flash butt-welded rings like this have been used in critical applications such as jet aircraft engines and present day missiles. They offer cost saving advantages in many fields, particularly where stainless or other heat or corrosion-resistant materials are employed.

Amweld's experience in forming, welding and machining circular parts is available to you. Write or call today. Or send blueprints and specifications—we will be glad to study your problem.

LEARN HOW FLASH BUTT-WELDED RINGS CAN REDUCE PRODUCTION COSTS.

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

AMERICAN WELDING

Consumers Back Steel Industry's Tough Labor Stand

Nine of ten steel users stand squarely behind the steel industry in its fight to curb inflation. That's what STEEL found in a survey of metalworking executives across the nation (Page 55). Example of the users' sentiments: "Our sympathies are with the steel companies as are the sympathies of all companies which have the problem of utilizing labor efficiently." That's the feeling of Wade Harris, president, Midland-Ross Corp., Cleveland.

Tool and Die Men See Upswing

The tool and die industry, a traditional barometer of metalworking production, expects substantial gains next year. Business has leveled off somewhat due to strike-caused deferments, but 1959 volume is expected to be about 15 per cent greater than that of 1958.

The Manager of the Future

Project yourself and your job ten years into the future. Will your job move upward in the management stratum —or downward? For some insight into the possibilities, read how Jim Marvin, head of Midwest Metalworking, a mythical firm operating in 1970, and his management team approach day-to-day problems (Page 99).

Small Business Machine to Pick Up Steam

"Small business is just beginning to flex its muscles as a pressure group. It's increasingly articulate . . . everybody's friend . . . potentially as powerful as the farmers. Its voice is becoming increasingly effective in influencing legislation. There are around 7.5 million sole owners, partners, and stockholders in small businesses today." That comes from Dr. A. M. Woodruff, dean, School of Government, George Washington University.

Plastics Challenge Metals for Auto Parts

Reports William P. Gobeille, manager, Plastics Div., American Motors Corp.: "Our plastic lab studied auto uses for plastics which indicated functional improvements, or cost savings, or both, in areas where there is no question of plastic suitability. Being as conservative as possible, it arrived at over 100 lb per car. That was tailored down to 60 lb because we felt we would have been straining the credibility level of our engineering executives. If

steel prices continue to increase, we will get more plastic business." The average 1959 U. S. car uses about 20 lb of plastic. The Volkswagen uses more than 40 lb. Says Mr. Gobeille: A spate of new higher physical plastic materials is triggering the increase in plastic applications. We are testing a use, which, if adapted by all, would mean consumption of 40 million lb of plastic per year.

How to Find Good Men, Upgrade Their Talents

This recruiter has a good hold on a talented young man, but his bizarre methods will probably lose out to a more polished talent hunter. The manpower shortage makes recruiting a tough, competitive job—and a mighty important one to your company's success. For tips on how to go about it—and how to train the men you find—see Page 61.

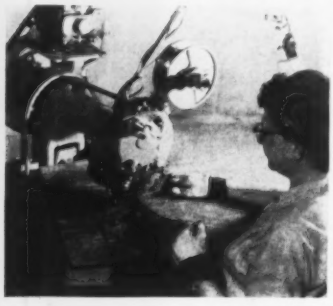
Supply of Engineering Grads: Slimmer in '60

The number of students earning bachelor degrees in engineering in 1960 will be short of expectations. A recount, just completed by Engineering Manpower Commission, reavels:

From ECPD colleges*	1960	1959	1958
Aeronautical	1,285	1,300	1,188
Agricultural	350	360	359
Chemical	2,975	3,025	2,920
Civil	4,975	5,050	4,673
Electrical	9,400	9,500	8,712
General	685	710	683
Industrial	1,825	1,875	1,783
Mechanical	8,350	8,425	7,859
Metallurgical	670	680	662
Mining	190	205	220
Other	1,750	1,800	1,477
Total	33,115	33,615	31,216
From other colleges	4,300	4,350	4,116
GRAND TOTAL	37,415	37,965	35,332

*Schools accredited by Engineers Council for Professional Development.

Metal Stitching Simplifies Production



Practically any unhardened metal can be stitched. A coil of wire is cut, formed, driven through the material, and clinched—on one machine (see picture). Users report substantial savings. Example: Amana Refrigeration Inc., Amana, Iowa, reduced material costs 66 per cent in assembling aluminum freezer liners. Stitching is replacing rivets, bolts, screws, spotwelds, in some applications (Page 110).

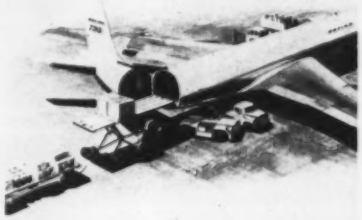
Challenge for Industrial Engineers

In 10 to 20 years, expect a large proportion of the presidents and operating vice presidents of major companies to be former industrial engineers, predicts

Willard F. Rockwell Jr., president, Rockwell Mfg. Co., Pittsburgh. His reasons: 1. Rapid technological progress makes management "increasingly an engineering proposition." 2. Growing dependence on "cost reduction by way of productivity increases" to maintain profit margins. 3. Foreign competition, making cost reduction "even more urgent." 4. Manpower shortages that can be offset only through greater productivity. Mr. Rockwell also predicts: 1. The industrial engineer's work will become less specialized or specialized in more different directions. 2. Time study and work measurement will be done by technicians, not engineers. 3. The industrial engineer will have to qualify as a teacher, writer, speaker, and salesman. 4. He must learn to talk to management in its own language to sell ideas. 5. He will be used increasingly to reduce indirect rather than direct, costs (example: office vs. plant).

Jet Age Is Boon to Air Freight

Jets will about halve the cost of air freight shipping over long hauls, reports Boeing Airplane Co., Seattle. Example: The old DC-3 has an operating cost of 11.5 cents per ton mile; turboprops cut the cost to about 4 cents; commercial jets may drop it to about 3.5 cents. Look for air cargo volume to hit 10.8 billion ton miles by '65 (Page 58).



He Urges Competitors to Join Forces

America is drifting dangerously toward greater economic maelstrom, largely prompted by cutthroat competition," asserts P. Peter Kovatis, executive secretary, National Association of Metal Finishers. He says competitors should band together for their own good—forming local associations, developing co-operative advertising, improving standards of quality and production, insisting on business ethics.

Cargotainers Stretch Your Storage Space

Collapsible wire mesh containers may help you reduce storage space as much as 80 per cent and trim handling costs by 20 per cent or more. The Cargotainers offer strength, flexibility, accessibility, visual inventory, long life, high stacking, and handling ease. You may be able to eliminate part handling between operations. All those advantages have accrued to Haskell Mfg. Co., Oakmont, Pa., maker of metal furniture (Page 112).

Marketers Take Note

Population trends of the coming decade will have a decided effect on metalworking sales. Total consumer markets (in real terms) may be 35 to 40 per

cent larger in 1970 than they are today, predicts Chase Manhattan Bank. Growth markets to watch: 1. Teenagers. 2. Family formations (the average wedding means about $1000 in new business; the average household formation means about $3000; the average new baby, $1000, says Chase Manhattan). 3. Older people. By 1970, we'll have 24 per cent more people over 65 than we have today. That means bigger markets for TV sets, radios, phonographs, tools. 4. The luxury market. 5. The replacement market.

Transistor Import Battle Rages On

Today's government procurement concepts are about as appropriate to present needs as "a Civil War cannon at Cape Canaveral," storms David R. Hull, president, Electronic Industries Association. EIA is conducting a vigorous campaign against Japanese transistor imports which have already captured 25 per cent of the U. S. market for entertainment type transistors. Mr. Hull reports that U. S. makers' sales to the entertainment market have largely paid for the industry's research and development programs.

Colleges: A Growing Market

By 1967, America's colleges and universities will need at least $11.5 billion for plant and equipment expansion, reports the Council for Financial Aid to Education. Plant investment per student amounted to $2974 in 1956, will reach $3834 in 1967.

Most Firms Retain Outside Legal Talent

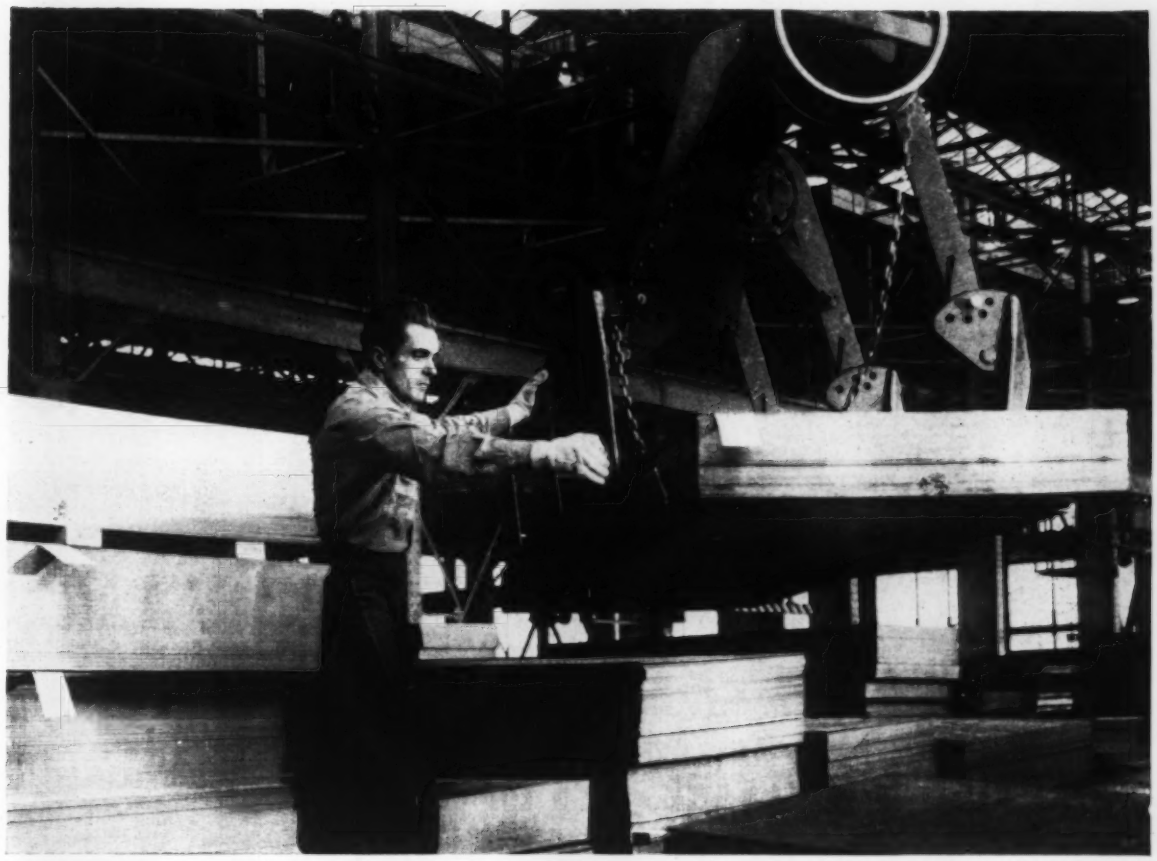
A National Industrial Conference Board survey discovers: 1. Most companies employing more than 1000 have internal legal departments. And 2 in 3 also retain permanent outside counsel. 2. Some firms keep attorneys on the payroll for legal work in specialized areas only. Examples: Patents, taxation, labor relations. 3. Counsel usually reports to the company president.

Russia's Electric Output Surges, but U. S. Is Far Ahead

By 1965, Russia will have about 2200 kw-hr of electric energy per capita vs. about 6300 for the U. S. In 1957, Russia had 1000 vs. our 4200. In 1940, it had 250 vs. our 1400. "They're working like hell to build their power systems," reports Edwin Vennard, vice president, Edison Electric Institute.

Straws in the Wind

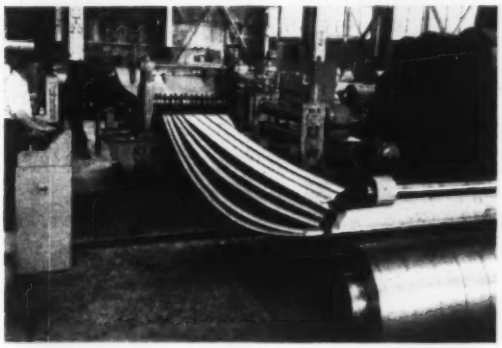
Midland-Ross Corp., Cleveland, has purchased Surface Combustion Corp., Toledo, Ohio, for $23 million . . . Continental Can Co. has enough steel to fill normal orders through the end of the year . . . Construction contracts in 1960 will drop slightly from this year's record volume, predicts F. W. Dodge Corp. . . . A strike of 3200 electrical workers at Singer Mfg. Co., Elizabeth, N. J., ended last week . . . Rock Island Railroad will buy 500 new boxcars and 100 flatcars for piggyback service . . . Chesapeake & Ohio Railway is increasing the use of its Railvan, a vehicle that operates with equal ease on highways and rails . . . Remington Rand says its new Univac Larc can perform 250,000 additions or subtractions of 12-digit decimal numbers per second . . . The Conference on Economic Progress, Washington, believes that average family income in 1964 will be $1950 greater than that of 1958.



Flat sheets produced from coils in 577 different lengths—up to 16'.

Now... reduce sheet-forming costs

with Ryerson quality-controlled steel



Accurate slitting on widths up to 48".

Whether you use hot or cold rolled sheet or strip, you can now make sure of the utmost in formability and weldability—by ordering to .10 maximum carbon content (SAE 1008) from Ryerson.

This means you can minimize, or even eliminate, the problems of variation in forming and welding quality—caused by the average wider range of carbon content.

You'll also find Ryerson prepared to give you fast, accurate service on your special requirements: strip and sketch cutting, blank shearing, edging, coil slitting, etc.

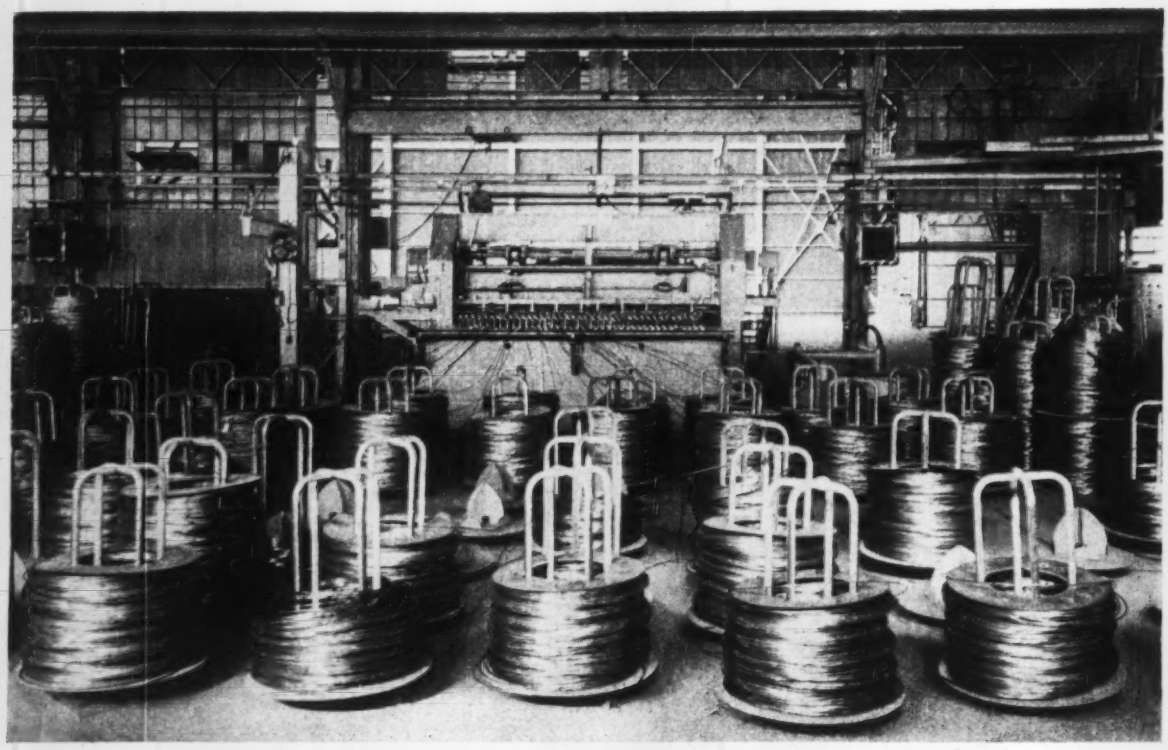
A Ryerson sheet and strip specialist is as near as your telephone—qualified by experience to recommend the stock exactly suited to your requirements, at the lowest cost. Put Ryerson steel experience and unequaled facilities on your cost-cutting team today.

RYERSON STEEL®

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

NATION'S MOST COMPLETE SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST



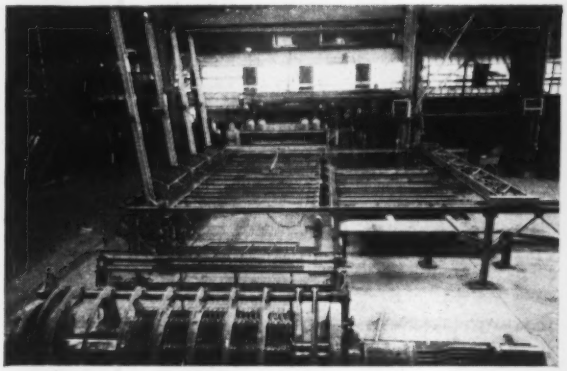
Let DSC LPR COILS help cut your brite wire fabricating costs as they have done for our Portsmouth Division on Welded Wire Fabric

Look closely at the entry side of this giant Welded Wire Fabric machine. This one produces mesh in widths up to 13', used for reinforcing concrete in road, pipe and other construction. Fed by as many as 80 - 3,000 pound Brite Wire LPR's running simultaneously off as many reels, it produces rolls from 300' to 500' long, weighing up to about 6,000 pounds. The flat mats or sheets run up to 30' long.

In the photograph at the right, you see the delivery side of the welder, shear in the background, coiler in front and, in between, the fully automatic "flipper" and piler . . . the only one of its kind, we are told.

Our original purpose in developing continuous-length, long-production-run LPR's was to improve the efficiency of our own mesh operations. Compared with regular mill coils weighing about 300 pounds which we used previously, our 3,000 pound LPR's reduced downtime frequency by 90% and attendant coil-change and other costs proportionately.

PRACTICAL POINTERS on wireworking and complete information on DSC LPR's are available to you for the asking—call your nearest DSC Customer "Rep" office or write to Detroit Steel Corporation, General Sales Office, Box 4308, Detroit 9, Michigan.



FREE: Reprints of *"The Drawing and Handling of Long Production Run Wire Coils"* . . . a paper by Uno V. Johnson, Superintendent, Portsmouth Division Rod and Wire Mill, presented at the October Wire Association Convention . . . Send requests to Detroit Steel Corporation, Box 4308, Detroit 9, Michigan.

Customer Satisfaction Is Our No. 1 Job

The PROOF of DSC

DETROIT STEEL

is in its performance on your job

CUSTOMER "REP" OFFICES IN PRINCIPAL CITIES

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Only 51 Days

Past steel strikes have often found producers pinched between union demands and customer demands. We suspect that the pressure by steel users has sometimes been the more influential in forcing a settlement.

But this is another year. Steel users, although hurting badly for want of steel, are urging producers to hold the line.

A survey of metalworking executives across the country (see Page 55) shows they overwhelmingly want producers to fight on for a noninflationary settlement and to correct contract language that promotes featherbedding and restricts efficiency.

Steel users recognize that producers are fighting their battle too. "Actually," says one, "we have more to gain from a noninflationary settlement in steel than the producers themselves. They (the producers) could pass along increased costs in higher prices. We can't."

Another says: "This is the first organized stand against inflation since the war. I hope to God the industry sticks to its guns."

Sympathy is fine. Moral support is wonderful. But a more active effort is needed if industry is to win the battle to contain inflation and to gain labor contracts that permit optimum efficiency.

We suggest that metalworking management do their share by talking directly to workers, to workers' wives, and to neighbors.

Discuss inflation. Discuss how restrictive work practices endanger American jobs. Use all available media—radio, television, newspapers, employee meetings—to get understanding among workers, their families, and friends.

We further suggest: Steel management should take its friends into closer confidence on the work rules issue.

Talk up specific cases. Talk up the cost of protecting waste and inefficiency via local working condition clauses. Steel management has a powerful story to tell, but it has done a poor job of communicating.

The objective: To gain either a reasonable negotiated settlement, or to persuade steelworkers to reject the senseless strike in the elections starting after Jan. 5.

There are only 51 days left.

Walter J. Campbell

EDITOR

on the Mighty Mississippi . . . a single Cleveland reducer drives this dredge's 48-inch auger

Keeping America's major rivers navigable is a tremendous year 'round job. It takes rugged dredges that can stay on the job 24 hours a day, if necessary.

This 12-inch hydraulic dredge operated by the Ferd J. Robers Company of Burlington, Wisconsin moves approximately a million yards of sand, gravel and muck from the Mississippi River bed annually. Its 48-inch diameter knife is driven by a large Cleveland Worm and Gear speed reducer that's providing trouble-free service year in — year out.

Many Clevelands are still in use today after more than 35 years of rugged service in mills, mines and on all types of industrial equipment. Whenever a powerful, trouble-free, right angle drive is required, consult your local Cleveland representative — or write us direct for Bulletin 145. It gives the complete Cleveland Story.

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'Hold That Line,' Say Steel Users

NINE OF TEN metal users support the steel industry's labor stand:

1. To grant only such wage increases that would permit holding the line on steel prices.
2. To correct labor contract language to permit optimum efficiency in steel operations.

• **Cross Section** — STEEL editors went to metalworking presidents and other top executives across the nation to learn the thinking of representatives from small, medium, and large plants making a variety of consumer and industrial products. The majority had curtailed or stopped operations for lack of steel.

The metalworkers are strongly against any wage settlement that will be reflected in a steel price rise. Most agree that the Kaiser Steel Corp. settlement would be inflationary for most other steel companies. The typical comment: "In every postwar steel price increase, we've had to absorb much of the extra cost because competition didn't permit passing it on. Compounding the problem, we have to match the wage increase."

Metalworking generally applauds the steel negotiators' firm stand on work rules. In effect, the steel industry is fighting its battle too. Typical comment: "We, as managers, can't afford to lose control of operations if we are to remain efficient. It's the only way we can

FEATHERBEDDING

"This (work rules issue) is adding thousands of dollars to our costs. The steel industry has our 100 per cent support in attempting to put a stop to makework and uneconomic practices."

—Paul F. Avery, president, Avery & Saul Co., Cambridge, Mass.

"They (the steel companies) must at least get an agreement that the work rules issue will be arbitrated."

—F. R. Dickinson, president, Townsend Co., Beaver Falls, Pa.

"We set up our work rules committee in April, 1959, anticipating the problems six months in advance of contract expiration. We worked out changes prior to the monetary settlement—an approach that is probably the safest and most productive. We feel we are in a better position than either Kaiser or the basic steel industry."

—Thomas F. Morris, vice president, SKF Industries Inc., Philadelphia

"The work rules issue is a red herring. Settle the dispute on any basis."

—New Jersey maker of electrical products

WAGES

"We have to hold the line on increases now. The steel industry will never have a better chance."

—Glen Carlson Sr., president, Acme Mfg. Co., Detroit

"This is the first time steel industry management has taken a stand that approached being strong enough."

—James E. Bateman, president, Spiral Brushes Inc., Cleveland

"As long as the strike has gone this long, the wage issue should be fought out. It's more important than work rules because it bears directly on prices."

—Fastener manufacturer

PRICES

"I applaud the steel industry's stand to curb inflation. Prices of our 1960 line have no padding to cover possible steel price increases."

—Judson Sayre, president, Norge Div., Borg-Warner Corp., Chicago

"We're hurting badly, but by God it's time someone tried to halt inflation. I hope they (the steel industry) can do it."

—Auto company executive

"The steel companies could have put the union on the defensive months ago by cutting prices $5 a ton. If they'd done so, the strike might have been averted."

—Vice president of material handling equipment maker

meet foreign competition."

• **Companies Canvass Customers**—The steel industry is canvassing many of its customers in the same vein. This question is often asked: Will we in the long run lose your business because of the long strike? The answer has been a resounding "No," say the steel firms.

Common also have been trade association resolutions backing the steel industry's stand. One of the most recent comes from National Slag Association, Washington. It points out that the "steel producers' struggle affects each of us too."

• **And Criticism**—Although nine of ten respondents to STEEL's survey support the industry's position, three of ten criticized the steel companies' tactics in some way. American Motors Corp.'s president, George Romney, thinks that "holdout" collective bargaining is outdated. He believes the industry and union are in a power struggle instead of true collective bargaining. He wants a return to individual company-union bargaining so that smaller firms won't be squeezed into accepting what the Mr. Bigs might want. He sees the Kaiser-type settlements as going in the "logical direction."

But most criticism centers on the companies' public relations approach during the case. A Midwestern fabricator thinks the public was entitled to a clearer explanation of why Kaiser could afford to sign but other companies could not. A maker of building products admits the work rules story is hard to sell, "but the companies should have packaged it better, with all the high powered talent at their command."

An eastern appliance manufacturer says: "The companies got off the track when they stopped concentrating on inflation only and added work rules. They clouded the issue, and it has remained cloudy in the public's mind. In the fog, some can't see that the United Steelworker charges of union busting are unfounded."

• **Leave Them Alone** — Criticism was also leveled at the sideline coaches. The president of an eastern warehouse exclaims: "Leave the negotiators alone, can't you? All this kibitzing has caused most of the trouble."

This tree in the tracks of a millyard goes down as . . .

Steel Plants Start Up Fast

STEEL INGOT operations hit an estimated 40 per cent of capacity in the week ended Nov. 15.

Although the return to work after the 115 day strike has been as good as the most optimistic could expect, capacity operations won't come before early December. Capacity shipments won't be possible until mid-December.

• **Dates to Watch**—The 8 to 1 Supreme Court decision upholding the use of the Taft-Hartley injunction circles two dates on the 1960 calendar: Jan. 5 will be the 60th day after the High Court ruling of Nov. 7; after that, the National Labor Relations Board will hold an election to determine if steelworkers accept the companies' last offer. Jan. 25 will be the 80th day of the strike moratorium; after that, the USW can strike again if members have rejected the last offer.

You can erase the circles around Jan. 5 and Jan. 25 only if the two sides settle before then. They are required by law to continue bargaining during the injunction. The major companies haven't gone back into session during the first nine days of the injunction because they have been concentrating on getting the mills running again. Laclede Steel Co., which was not struck, reached a tentative agreement with the USW along Kaiser lines. The union says it's negotiating with "10 or 15 more smaller companies" for a similar agreement.

• **Pinch Hurts More**—An estimated 450,000 metalworkers are laid off

today for lack of steel (215,000 are in General Motors Corp. plants alone). Even more are working short weeks. Layoffs may peak at around 500,000 and hold there until mid-December.

• **Mill Damage Light** — Steelmen are encountering less damage than expected. U. S. Steel Corp., for example, can run 85 per cent of its 177 open hearths in the Central Operations (mills in the Pittsburgh area, Chicago, Gary, Youngstown, and Morrisville, Pa.). No blast furnace damage had shown up as of early last week, although all the units had not been lighted. Inland Steel Co. reports no major damage but has idled some open hearths and blast furnaces for repairs.

Some 70 to 80 per cent of the nation's 500,000 steelworkers are back on the job, but they all won't return until early December. One job hurdle was cleared at U. S. Steel's Tennessee Coal & Iron Div. Resumption of mill operations had been halted by a continuing strike of the Brotherhood of Locomotive Firemen & Enginemen operating rail facilities for TCI's Birmingham plant. Last week they accepted an interim work agreement which enabled the division to recall 3000.

Ewan Clague, commissioner of the Bureau of Labor Statistics, thinks steel employment could be about 500,000 throughout early 1960 if the strike doesn't resume.

• **Morale Good**—"Most of the men returning are glad to be back and anxious to prove they don't loaf on the job," supervisors report. Easing the pinch at several companies is the practice of paying early or giving advances.

J&L will advance its workmen $60 each if they want it. Repayment is spread over six paydays. Republic Steel Corp. and Inland offered to advance $50 to returning strikers.

• **The Losses**—In the 115 days of the strike, steelworkers lost $1,172,500,000 in wages. Steel companies lost $3,493,000,000 in sales. Some 32.7 million tons of ingots were lost. Overhead, depreciation, and salaries of nonproduction workers in steel cost the companies $672 million. The U. S. lost $755 million in taxes.

Iron Ore:
18 Million Ton Cushion

Stockpile, Nov. 1	56.3 million tons
Lake ore shipments expected, Nov.-Dec.	10.0 " "
Ore imports expected, Nov.-Dec.	4.0 " "
Ore imports expected, Jan.-April	7.0 " "
Ore stocks anticipated through April	77.3 million tons
Consumption estimated, Nov.-Dec.	15 million tons
Consumption estimated, Jan.-April	44 " "
Estimated consumption	59 million tons

WITH A BREAK weatherwise, the steel industry should have adequate iron ore supplies for near capacity operations through next spring.

Ore movement on the Great Lakes began almost immediately after T-H injunction took effect. Several full cargoes were downbound to lower lake docks when the strike was called.

The official 1959 lake navigation season has been extended to Jan. 1, but it's questionable whether shipping lanes will remain open that long. Shippingmen are hoping the freezeup won't come before Dec. 15. Twenty degree temperatures at the head of the lakes have already slowed some activities.

The Great Lakes fleet (241 vessels) has a trip capacity of 2.9 million gross tons. It's doubtful if all will be able to get into commission, and observers feel that trip capacity by the close of navigation will be no more than 2 million tons. Another factor: The normal lake trip (up and down) takes about five days, but in cold weather it usually takes six.

• **Imports**—Imports are providing a substantial boost to the ore stockpile situation. Officials at Pittsburgh Steel Co., a big user of imported ore, report they'll be in good shape because of long term contracts for winter shipments. U. S. Steel Corp.'s eastern mills also depend considerably upon imported ore.

Additional insurance is afforded by the railroads. During the Korean War they hauled 7.9 million tons. But this mode of transport is more expensive than lake shipping, and the car situation could present problems because of the coal movement.

Scrap Stocks Adequate Too

To help ease the burden on iron ore supplies, steel mills are expected to use more scrap in open hearth melts.

Over-all scrap stocks are adequate to support high level mill operations, but the better grades are not too plentiful. Scrap brokers and dealers report substantial amounts of No. 2 dealer steel are available —more of this less desirable grade will probably get into furnaces.

Scrap statistics haven't been reported since July because of the strike. June figures showed consumers' stocks at 8.1 million tons and consumption at a monthly rate of 6.3 million tons.

The recent slackening of metalworking operations will probably tighten supplies.

The deevlopment could be reflected in a price rise.

How Blairsville Machine Saved Almost $5000 by Using Air Freight

Leon H. Kirkell, president, Blairsville Machine Co., Blairsville, Pa., is sold on air freight. Here's why:

• THE JOB—The company had a long run order for thin wall tubing for ordnance purposes. It was set up on a Cincinnati broach which uses a 4 ft cutter bar. About 1500 pieces are run before the cutter must be resharpened. Blairsville Machine had 20 cutters at the beginning of the run. No sharpening facilities are nearby, so the company was faced with the prospect of returning the cutters as they became dull to Triangle Broach Co., Detroit, for resharpening. If truck or rail transportation were to be used, Mr. Kirkell figured he would need 20 more cutters (at a cost of $5000) to maintain production.

• THE SOLUTION—Blairsville Machine decided to try air freight. Results: It got 48 hour service between Pittsburgh and Detroit. It did not have to purchase the additional cutters.

Dull cutters are delivered in the morning by truck from Blairsville to Emery Air Freight Corp., Pittsburgh.

The Emery line delivers the tools the next morning in Detroit to Triangle Broach. That firm resharpens them that day and has them back in Blairsville the following day.

Emery Air Freight uses scheduled airliners. Mr. Kirkell is kept in touch with the shipment so that he knows within 2 hours when a cutter will reach Triangle Broach or be returned to the plant in Blairsville.

Jets to Blast Long Haul Freight Costs

THE JET AGE should prove a boon to air freight. That is the word from Boeing Airplane Co., Seattle. Jets will about halve the cost of air freight shipments over long hauls if shippers have the wisdom to properly utilize them.

• The Boeing 735—For example, Boeing figures the old DC-3 has an operating cost of 11.5 cents per ton mile; four engine planes reduced the cost to about 7 cents, turboprops to about 4 cents. With the advent of the commercial jet, a 3.5 cents per ton mile operating cost is within reach.

That figure would be possible on a trip of at least 1500 miles with an 80 per cent payload (the 735 can carry 100,000 lb). Pratt & Whitney turbofan engines will be ready by June, 1960. Delivery of the first planes (modified 707s) will be accomplished by 1961.

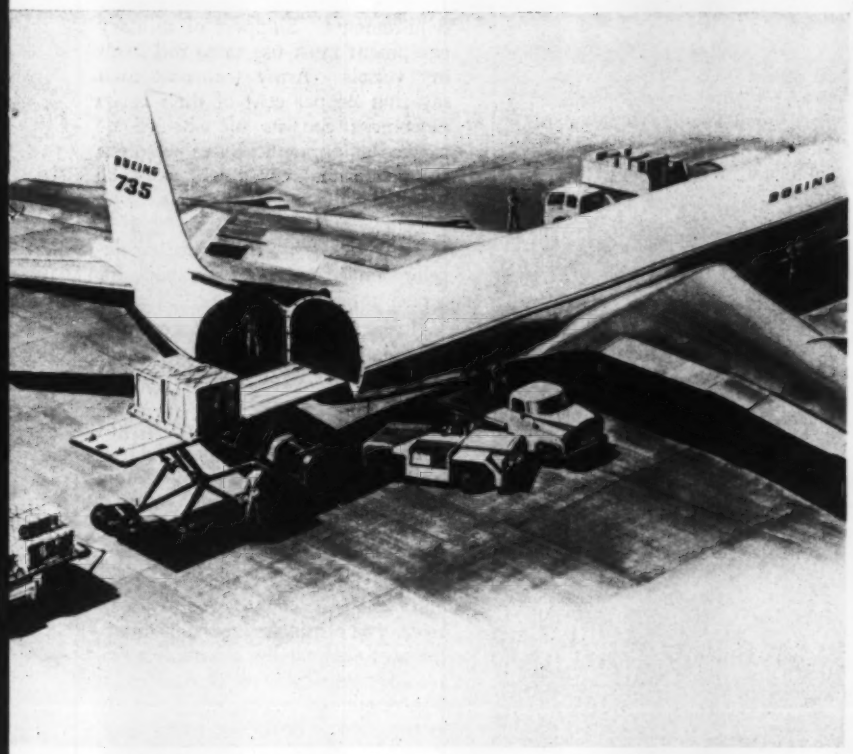
The only significant modification from the 707 is the 735's swing tail for easier loading. Range is over 3000 miles. Air conditioned and pressurized cargo space totals 9000 cu ft, says J. B. Connelly, vice president-general manager of Boeing's Transport Div.

• Ground Equipment—Mr. Connelly notes that the 735 is part of a modern integrated terminal-to-terminal cargo system under development. The system will include ground transporters, special pallets, preloaded containers, and other equipment for rapid loading and unloading. The craft's speed of 600 mph will enable it to make a transcontinental delivery in 6 hours, including 1 hour for ground handling.

• Potential of Air Freight—What aircraft industry spokesmen tell STEEL and examples of metalworking company savings already at hand (see exhibit) may convince you that a breakthrough in air freight is imminent. American Airlines Inc., for example, expects an air freight volume of 100 million ton miles this year compared with 2 million ton miles in 1945.

Heretofore, air cargo has been secondary to passenger transportation. Stanley H. Brewer, professor of transportation, University of Washington, has described the situation this way: "Uneconomic, technologically obsolete aircraft . . . have been used most extensively for the movement of air cargo."

He has estimated a growth rate of about 20 per cent per year. The air freighters today are flying only 5 to 10 per cent of the cargo they should be. Although air cargo has



Boeing's hinged tail 735 jet (a modified 707) offers the sort of loading and unloading facilities shippers have been waiting for. Delivery of the plane is set for 1961

grown 12 times in ton mileage since World War II, it accounts for one-tenth of 1 per cent of all cargo movement. Boeing figures it could be 1 to 2 per cent.

• **Principles of Air Freight**—Ordinary cargo today, report the air enthusiasts, moves at a rate of 3.5 miles per hour, counting handling and storage time. That's little improvement over what time it might have taken George Washington to secure supplies for Valley Forge.

Of course, there are principles involved in considering air cargo shipments: Value, perishability, fragility, bulk, need for speed, inventory savings, and landing costs are a few of the items your traffic managers must take into consideration.

• **Costs**—With operating costs dipping in the jet era, rates for metalworking firms should dip accordingly. Aerospace Industries Association suggests rates now average about 26 cents per ton mile. Jets like the Boeing 707 could cut rates to 10 or 12 cents per ton mile.

• **Markets**—Louis J. Hector, Civil Aeronautics Board member, says manufacturers can gain nationwide distribution from a single plant via air freight, and could avoid the expenses of constructing new warehouses or maintaining larger inventories as they decide to move into new markets.

• **Enthusiasm** — Naturally, some companies and some government agencies are more interested in the potentials of air cargo than others. Checking with the Federal Aviation Agency for a reliable prediction, STEEL learned that an increase in air cargo from 1.8 billion to 10.8 billion ton miles is possible by 1965, if you include defense and postal shipments with commercial shipments, and if the reputed low operating costs of the new jets are verified in service.

Commercial shipments could increase from 800 million to 7 billion ton miles in the next five or six years with the advent of jet air cargo, says FAA.

The agency is appealing to Congress for funds to conduct a thorough research job on air freight potentials, so that it will be in a position to recommend airport standards and other regulations which will be needed if the air cargo age comes to pass.

In terms of dollars, by 1975 value of U. S. air cargo (domestic and international mail and freight) could climb to $4 billion from today's $150 million, says the AIA.

More Docks for Barges

Construction of barge terminal facilities continues to dominate waterside plant developments, reports the American Waterways Operators Inc., Washington.

One hundred seventeen barge docks and other terminals were put in place by the end of the third quarter vs. 92 projects in the corresponding period of 1958. The new structures represent 52 per cent of the 226 waterside plants constructed or started in the period. This is the highest rate of construction recorded by AWO for the first three quarters since the survey was started seven years ago.

Urban Centers to Swell

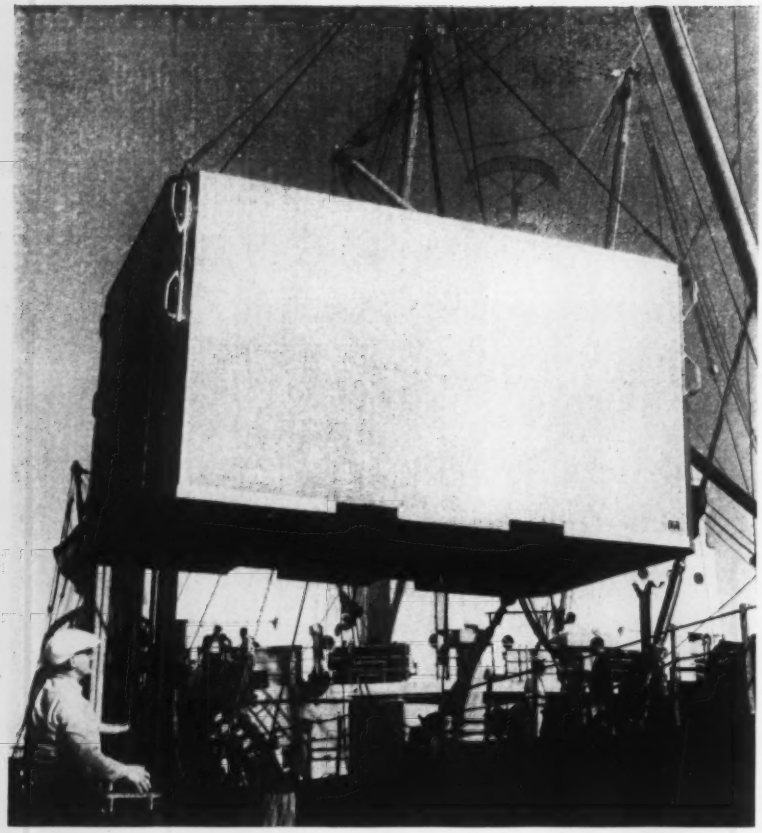
Our mushrooming society will be 85 per cent urban by the year 2000. Some 320 million will live within urban areas.

Those figures appear in a study by the Urban Land Institute, Washington.

Dr. Jerome P. Pickard, economic geographer and population analyst, predicts that ten supermetropolitan areas will contain one-third of the nation.

The new superareas and their projected populations as calculated by Dr. Pickard:

Baltimore and Washington, 9.5 million; Philadelphia, 8.5 million; Miami, Fla., 6.5 million; Boston, 6.5 million; Cleveland, 5 million; New York, 23 million; Los Angeles, 20 million; Chicago, 11 million; Detroit, 9.5 million, and San Francisco, 7.5 million.



Gantry crane lifts containers aboard ship at Encinal Terminals, Alameda, Calif.

Fishyback Trade Flourishes Despite Some Growing Pains

FISHYBACK freight, the maritime equivalent of piggybacking is making a fair sized splash in the shipping industry.

More than 20 U. S. steamship companies are in the business because of lower distribution costs, reduced damage and losses, and faster service, but few have undertaken major programs to convert or build ships solely for fishybacking (also called container loading). The method is growing fastest in coastwise, Caribbean, and Hawaiian trade. Inland waterway traffic is mostly bulk freight.

Fishyback ships are designed for roll loading or lift loading. Roll type ships have built-in ramps to load and unload wheeled vehicles. Lift loading vessels have no interior decks but are fitted with slots, or cells, into which freight containers can be lowered. Many ships also have outer deck fittings to secure topside containers.

• Lift loading ships are preferred by most commercial shippers.

By confining traffic to trailer bodies or containers, they save space that otherwise would be taken by wheels and chassis. Terminals which have heavy traffic in lift loading can be equipped with truck and trailer chassis to meet their requirements. Shippers of military equipment must use some roll loading vessels. Army transport men say that 24 per cent of their cargo movement consists of wheeled or tracked equipment. Bases are often situated where containers can't be handled.

• Fishyback growth is awaiting development of universal standards for carrier interchange.

Herbert H. Hall, Pittsburgh material handling consultant, is heading a special committee organized by the American Standards Association to develop standard freight container sizes. A number of U. S. and international cargo handling and standards groups are co-operating. Their goal: A container which could be shipped by any transportation carrier.

"Numerous companies, often demonstrating little regard for interchangeability with other systems, are spending millions of dollars on captive container systems, especially in the marine field," says Mr. Hall. But "the first four shipping companies to use captive containers are all using a different size."

Among the companies offering fishyback service:

Pan-American Steamship Corp., with lift load service from Port Newark, N. J., to Atlantic and Gulf ports and Puerto Rico, has ten converted ships in operation. Grace Lines will soon have two lift load ships ready for the New York, Caribbean, and South American trade; contracts for three new Grace Lines passenger-container ships are pending awards.

Seatrain Lines Inc., a fishyback pioneer with its railroad freight car service (1929), inaugurated seaborne container service last year.

Matson Navigation Co., now using converted C-3 freighters to carry 75 containers on deck in addition to regular below deck cargo, will have its first all-container ship in operation next year. It'll service ports in California, the Pacific Northwest, and Hawaii.

Alaska Steamship Co. moves much of its freight between the U. S. and Alaska with lift-type containers.

Containerships Inc. says it plans to place two roll loading motor ships in service next summer on the New York-Jacksonville, Fla., run.

How to Find Good Men and Upgrade Them

NOW—more than ever before—a company's success depends on the effectiveness of its recruiting techniques and training programs.

STEEL has heard that statement many times in recent weeks—from company presidents, placement firms, management consultants, personnel men. The reasons for the emphasis: Metalworking is facing a severe shortage of managerial, technical, and skilled personnel (see STEEL, Oct. 26, p. 96). Employee turnover is on the rise as personnel raiding again runs rampant. Educational institutions aren't turning out enough engineers, scientists, and management trainees to meet the demand. Apprenticeship programs aren't able to keep pace with industry's needs for skilled workers. And the nation's consuming population will grow much faster than the producing population in the ten years immediately ahead.

Result: Adroit executives are polishing their recruiting and training machinery. Here are some of the approaches they're using:

• **Measure Your Needs** — General Motors Corp. has a program it calls "management manpower planning." Each division regularly determines its requirements for one, three, five, and ten years in advance. It then rates its employees, each being classified as "immediately promotable," "promotable with training," or "adequate in present job" (other classifications are used when an employee's work is unsatisfactory). Such an audit permits GM to predict its manpower needs and gear its recruiting and training machinery to fit them.

Minnesota Mining & Mfg. Co., St. Paul, analyzed its management payroll over a five-year period and found a correlation between sales and the number of managers at the end of a year in various classifications. It applied the correlation to its sales forecasts to find the number of managers it would need in

Nine Repulsive Recruiters . . .

BIZARRE BILL—He reasons that the best way to attract a man is to make a memorable impression. His cravat is a conversation piece; his talk is mainly about exotic cocktails and sports cars. He can't bring himself to discuss the company.

ELEMENTARY ED—He's armed with a long story about his company's fabulous future but fails to tell the potential recruit how he'll fit into the picture.

HUNGRY HARRY—He hires every man he can find. His theory: The more men we hire, the more we have to choose from. So what if we have to let half of them go later. And why not hoard engineers?

JOVIAL JOHN—Anecdotes and back slapping are his recruiting tools. His theory: Men would rather have a good time than talk about their future.

MYSTERIOUS MARTY—Everything about his company is top secret—including the scope of the position he's trying to fill.

PATERNAL PETE—He delivers a dissertation on the job security his company offers, but he disregards the interviewee's desire to hear about the job's challenges.

SUPERLATIVE SID—Everything about his company, its location, its products, and the job are "tremendous." But he never gets down to cases.

VAGUE VIC—He "thinks the salary will be about $12,000." He "imagines that the position includes that function." He "guesses that the company's defense business is increasing."

FORGETFUL FRED—He outlines the job and gives the company's potential. But he fails to sell the firm's pension plan, paid insurance, good location, and other important fringe benefits.

More Companies Train Employees . . .

More companies are assuming the responsibility for the education of their employees. One measure of the trend comes from four surveys by *Personnel Management* . . .

Percentage of companies	1940	1947	1953	1957
Paying part of employees' education costs	25	25	44	61
Conducting special classes for employees	48	43	60	62
Employing co-operative students	39	28	54	55
Training employees off the job	33	27	40	41
Holding classes in foremanship	50	51	72	71
Having apprenticeship programs	—	34	45	42

Needed: More Apprentices . . .

APPRENTICESHIP was practiced at least as early as the thirteenth century. It came to America with the earliest settlers. But the ancient method remains extremely important to metalworking. Why?

It's well organized. It combines practice with theory. It offers dignity and recognition to the learner. It provides industry with well rounded craftsmen. It also keeps skills current with technology. It's one area of labor-management co-operation.

One of the biggest apprentice training programs in the country is conducted by Westinghouse Electric Corp. at 15 plants. Some programs run for two years and require 4224 hours of training. (Examples: Arcwelding, heat treating, sheet steel fabrication, pipefitting.) Others take four years or 8448 hours (diemaking, complex machining, moldmaking). Apprentices average 8 hours of classroom instruction weekly for the first four to six months, then 4 hours weekly. On the job, they are rotated. For example, a youth aiming to become a machinist will spend three months on maintenance, three months on automatic screw machines, three on engine lathes, three on boring mills, and three on grinders until he becomes skilled. Candidates for training must have four years of high school and have 1½ algebra credits, one in plane geometry, one in physics, and one in chemistry.

the future. Estimates proved accurate to within 1 per cent. It now uses a similar technique to forecast technical manpower needs.

• **Define Requirements**—Before beginning your research, it's wise to determine exactly what type man you need. Outline the training, experience, personal characteristics, aptitudes, and other factors that would be expected in the ideal man for the post. Maybe you'll have to compromise later, but you're more likely to stay inside the target area.

Men working in different fields for the same company might need considerably different traits. It's important to specify those needed most in each job. For example, the National Association of Purchasing Agents says a candidate for a purchasing position should rate high in these 13 characteristics: Initiative, interest in a challenge, human relations, mechanical aptitude, imagination, curiosity, adaptability, self-expression, ethics, judgment, analytical ability, tact, and sense of humor.

• **Search Your Ranks**—One company president told STEEL he was "amazed at the latent talent" he found "buried in the lower strata" of his organization. Maybe you have some. John E. Struggles of Heidrick & Struggles Inc., Chicago executive recruiting firm, suggests this procedure for finding them: 1. Personnel questionnaires. 2. Management evaluations. 3. Personal interviews.

• **Query Your Consultants**—Your management consultant, banker, attorney, or accounting firm may be able to help. They have intimate knowledge of your executive organization. "However, you should caution them to review candidates in depth," says Mr. Struggles. "Selective suggestions are best."

• **Use a Recruiter**—If you're trying to fill a top level job or a position that requires special abilities, an executive recruiting firm may be your answer. It has these advantages: 1. It is objective. 2. Its contacts are numerous. 3. It is experienced in pinpointing an advertising campaign to appeal to the select group you're aiming for. 4. It is free to make direct inquiries, without involving your company.

• **Find a Common Ground**—It's important—even in recruiting college students—to have your recruiter "speak the same language" as the job candidate. International Harvester Co.'s recruiting team includes a manufacturing representative, an engineering representative, and a personnel man. When looking for a salesman, a district sales manager is added; when seeking an accountant, a company accountant joins the team. Worried about this procedure boosting your recruiting costs? Asserts Carl Brunt, co-ordinator of recruitment, Jones & Laughlin Steel Corp.; "We're looking for men with management potentials, so we have no misgivings about using high priced talent to find them."

• **Stay Flexible**—You might want to change your approach depending upon the field for which you're recruiting. For example, says Mr. Struggles, "We believe that location and work environment are much more important to the technical man than to the manager. A research and development organization has a better chance to get top men if it can put its activity in a campus type atmosphere, while many management people prefer metropolitan locations." For clues to what motivates the technical man, see STEEL, Nov. 2, p. 52.

• **Salary Trend** — A Northwestern University survey of 194 companies in 25 states finds these starting salaries for 1959 college graduates:

	STARTING SALARIES	
	Over-all (Avg per mo.)	Top Recruits (Avg per mo.)
Engineering	$480	$503
Accounting	422	447
Sales	419	449
General business	413	439
Other fields	438	465

• **Keep Him Growing**—A manpow-

How Five Firms Fill Manpower Needs . . .

• SACO-LOWELL SHOPS, Boston, makes skilled workers out of hundreds of men who never saw machine tools before joining the company. The secret: On-the-job coaches. An employee learns a job, then teaches it to another. Results: More than 1500 employees at the textile machinery maker's three southern plants have been taught new skills. Saco-Lowell has a checklist of points to be covered for each job so that coaching is uniform. That also permits partially skilled men to serve as coaches, releasing the highly skilled people for production work. Classroom instruction, sometimes on an employee's own time, covers blueprint reading and shop procedures. Students also get homework—material covering the machines and processes they are to master. Designed for production men, the coaching system has been so successful that it's being used in the firm's sales and distribution divisions too.

• CLARK CONTROLLER CO., Cleveland, tailors its training program for engineers to the needs, goals, and experience of each trainee. A newly hired veteran might be given a permanent assignment after two weeks' training; it may take a man fresh out of college two years to reach a permanent post. But the company combines productive work with formal training. As Duane Cassidy, director of training, puts it: "We like to give our trainees a chance to make mistakes." Adds Mr. Cassidy: "An engineer's schooling tends to orient him to idealism, not reality; we attempt to fill the gap by putting the man in a problem solving situation." Clark's formal training program includes presentations by the vice presidents in charge of sales, production, and engineering (each points out growth opportunities in his area of the company), explanations of the functions of each division—by the division managers, explanations of pricing, purchasing, production planning, production control, finance, paperwork, and new product development, and a 64 hour briefing on the elements of electrical control.

• ADOLPH PLATING INC., Chicago, has been "plagued with a people shortage" throughout its 12 year life, says Robert L. Giesel, president. It has come up with a four point answer: 1. Control the chemical end of the processes by using outside consultants—often suppliers' specialists. 2. Automate wherever practical—reducing the need for skilled workers. 3. Outline in detail the functions to be performed by each production man; make each responsible for a small part of the over-all function—so broad knowledge is seldom required. On-the-job training provides the skills needed. 4. Instead of trying to hire supervisors with plating knowledge, hire industrial engineers who know production processes and can deal with people. Encourage them to further their education at company expense.

• U. S. STEEL CORP.'s Monroeville, Pa., research center sends its top men back to their alma maters to talk with deans and faculty members, interview promising students. U. S. Steel also offers summer work to college students. It gives company and student a chance to look each other over. The students get the same salaries for summer work as do new permanent employees. Says the company: "We're convinced that the program gives us a head start in the race for top talent." It also stresses this point to potential recruits: They can continue graduate work at company expense if they become permanent employees.

• JOHNSON BRONZE CO., New Castle, Pa., recruits skilled workers from its own backyard. The bearingmaker hires boys from local high schools and trains them. Its machinists serve as instructors. "Fortunately for us, vocational school training around here is very good. It's not unusual for a bright lad to become a first class machinist in six months. The boys learn how to use micrometers, how to read blueprints, and how to operate lathes, drill presses, millers, and shapers in school," adds Bill Wise, personnel manager.

er shortage during this period of rapid technological change makes your training program a prime competitive tool. By upgrading the talents of the men you have, you can fill many managerial, technical, and skilled posts from within your own company. That gives you an edge over the competitor who must go through a costly recruiting process to fill each vacant position.

• **Finding Creativity**—How do you discover which of your people possess creative ability? Richard Renck, director, Measurement Research Division, University of Chicago, suggests using the Cree Questionnaire (a disguised test of creativity and inventiveness developed at the University of North Carolina with the assistance of General Motors Corp.).

You can improve a man's creative ability. "Training in problem solving is one of the best approaches," says Mr. Renck.

• **Employee Orientation** — What you do with a technical or managerial employee during the first year or so after he joins your firm will have an important bearing on his worth to your company.

Many firms give the new graduate a variety of assignments to permit him to demonstrate any special ability. Others place the new man on a routine assignment for the first few months (example: the young engineer goes to the drawing board). "Probably an appropriate balance between the two, plus wise supervision and encouragement, is the best answer," suggests Frank S. Endicott, director of placement, Northwestern University.

Mr. Renck advises this approach: Since the young engineer tends to be oriented to "what ought to be," he is often blinded to "what is" in the world of interpersonal relations. The best way to overcome this is to guide him into small group projects where he learns how to work with people while he is still young and flexible. That way, he can develop the social skills he'll need to work with and supervise others.

• **"Task Force" Approach**—Special committees or "task forces" can be excellent training grounds for new recruits or management trainees. Whether set up to tackle specific problems or to handle a continuing project, they give new men a crack at solving problems and making decisions without giving them complete responsibility for the end result. A task force might include a seasoned manager, a man being groomed for a supervisory position, and one or two new men. The veteran can get a good idea of the others' ability to think and act constructively, while allowing his knowledge and experience to "rub off" on them.

• **"Split Powers" Approach**—This practical method involves the decentralization of a management function. The manager splits away a small, well defined, part of his function and assigns it to the trainee, giving him the authority and responsibility needed, while retaining the power to make final decisions. It operates on the theory that a man learns management best by managing.

• **The "Understudy" Approach**—Many companies acquaint two or more men with the functions of each key position; they "understudy" the star manager. Standard Oil Co. (New Jersey), one of the firms using this approach, reports that it always has qualified men to step into roles that are vacated. With executive raiding on the rise, this is an important consideration.

• **Use Co-op Schools**—Schools with co-operative education programs (students alternate periods of classroom instruction with periods of employment) can't meet the demand for their graduates. Many such schools are out campaigning to get companies to finance students' training. For many companies, the co-op school is an important source of supply for engineers. Example: 41 companies and government agencies participate in the co-op program at Illinois Institute of Technology.

• **Other Approaches**—Other helpful training techniques include regular performance reviews, role playing (the trainee is placed in an artificial, but typical, business situation and asked what he would do), job rotation, regular conferences, and the "observation post" (the trainee might be given an "assistant to" position where he learns by observing the experienced manager and relieves the manager by handling much of the detail).

• **The Engineer's Special Needs**—Mr. Renck's organization has made numerous surveys of engineers to determine their attitudes toward their work environment. He reports: Their attitudes are about the same as those of routine officeworkers—only slightly more favorable than production workers. They are definitely less satisfied than skilled workers, foremen, salesmen, and managers. And this finding is consistent regardless of their company affiliation. They tend to view the organization as confused and ill-conceived; they view management as confused and ill-advised. They tend to be job and career oriented and have a high degree of group solidarity. They think they are in industry to stay, but many are not sure what their roles are or what they can expect in the long term.

Unless industry moves to overcome such feelings, it can expect more engineers to join unions; it can expect continued low productivity; it can look for creativity to be stifled; and it can expect continuing conflict between its engineers and its managers. Here are some approaches toward solving the problem: 1. Recognize engineers' professional status by encouraging their active membership in professional societies. 2. Examine their job content to see if their talents are being put to maximum use. 3. Compare their salaries with other employees whose contributions are alike. See any inequities? 4. Keep them informed on their personal progress through merit rating programs, regular conferences with management, or simple informal talks with supervisors. 5. Remove any unnecessary controls.

• This is the last of four articles on the manpower shortage and how to meet it. Extra copies are available until supply is exhausted. Write: Editorial Service, STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Leslie B. Worthington, veteran marketeer, moves up as . . .

Big Steel Has New Chief

LESLIE B. WORTHINGTON, 57, was elected president and chief administrative officer of U. S. Steel Corp. last Tuesday at a special board meeting. He succeeds the late Walter F. Munford, who had been elected president last May. Mr. Worthington was also elected a director and chairman of the executive committee. And he becomes chairman of the operations policy committee in Pittsburgh. Roger M. Blough continues as chairman and chief executive officer. Harvey B. Jordan, formerly executive vice president-production, moves up to executive vice president and chairman of the general administration committee for the corporation.

Mr. Worthington had been president of Columbia-Geneva Steel Div., San Francisco, since 1957.

Born in Duckmanton, England, in 1902, he came to the U. S. in 1907 and became a U. S. citizen in 1912. The son of a coal miner, he was graduated from the University of Illinois in 1923, when he began his career as a sales apprentice at the South Chicago Works of Carnegie-Illinois Steel Corp., a USS subsidiary.

He became assistant manager of sales, Chicago district, in 1933, moved up to sales manager of the St. Paul district of Carnegie-Illinois in 1935. From 1936 to 1941, he served as Detroit district assistant manager of sales, then was transferred to Pittsburgh, where he was in charge of sales of bar, strip, and semifinished material for C-I.

In 1942, he was elected vice president of U. S. Steel Supply Co. (now a USS division). He became president of Steel Supply in 1946, and served in that post until his election as president of Columbia-Geneva.

Married in 1928, he has two sons.

He is a member of the University of Illinois Foundation, the American Iron & Steel Institute, the Chicago Club, and the Duquesne Club. He is a director of Stanford Research Institute.

Buying Men Foresee New Production Dips

PURCHASING AGENTS are keeping a cautious lookout for the first glimmer of rising business in early 1960, concludes the National Association of Purchasing Agents from results of its October monthly survey of members.

A cautious buying attitude, says NAPA, means that purchasing executives are keeping a flexible position, so they can quickly extend or contract commitments as the business picture slides into focus. Buyers surveyed by NAPA report that they expect a rash of reduced workweeks, layoffs, and shutdowns in the immediate period ahead because of the steel strike. Most expect strike effects to cast a pall over holiday retail sales.

• **Strike Reflections**—Depleted steel inventories caused October production to fall below that of the previous month, reported 24 per cent of the agents surveyed (the highest percentage since the spring of 1958). New orders were weaker than they had been in many months, with 27 per cent of the respondents reporting decreases, 45 per cent reporting no change, and 28 per cent reporting improvement.

Excluding steel items, most buying men plan no move to increase general inventories with the halt of the steel strike. Sixty-six per cent of the respondents say they will hold purchased inventories at present levels; 19 per cent plan further reductions; and only 15 per cent will add to stocks.

October steel inventory figures are the lowest of the year. While 43 per cent of the agents report no change from September, 42 per cent say stocks are lower. In the same period, buyers purchasing production materials hand to mouth has grown from 6 to 8 per cent.

Industrial commodity prices continue to inch up, say the buyers; 30 per cent tell of increases; 68 per cent report no change; and a fortunate 2 per cent are paying less. Price increases are noted in copper, lead, steel scrap, zinc, corrugated cartons, kraft paper, linseed oil, natural rubber, and some electrical equipment.

Senator Douglas readies his report on . . .

Steel Prices: How Inflationary?

THE STRATEGIC influence of steel prices on price indexes has been outlined in a new report from the Congressional Joint Economic Committee, chairmanned by Sen. Paul H. Douglas (D., Ill.). The senator describes the report as: "The kind of careful factual background which the committee seeks to lay preparatory to issuing a report in January . . . which will be a result of its far ranging studies of the relations of employment, growth, and prices."

The committee (says the staff written report) has learned that iron and steel accounted for 22 per cent of the increase in the wholesale price index (WPI) from 1955 to 1958, "even though it represents only 8 per cent of the weighted items that constitute the whole index."

The second biggest offender (says the report) was the motor vehicle category, which accounted for 14 per cent of the WPI increase, while it also constitutes about 8 per cent of the weighted items.

The appearance of the report is certain to add fuel to the fires Congress plans to build under the industry next year (STEEL, Nov. 9, p. 114).

Indirect Inflationary Tendencies Cited

The report also states that the steel industry occupies "a uniquely strategic role" in the whole economy: "Any price increase in steel ripples through the economy . . ."

It should be noted that analysts speaking for the Republican administration have played down the "rippling." This Democratic inspired report lays the inflationary tendencies of steel on the shoulders of labor and management.

The committee report adds: "Steel wages are determined in key wage bargaining, often setting the pattern for other industries including, at times, automobiles, metalworking, fabricating, aluminum, and cement."

Figuring the "cost push" from steel, the report concludes: The WPI at the end of 1958 was 9 points higher than it would have been if steel prices had not advanced faster than other prices since 1947. "If steel prices had changed the same way as the average of other prices in the index, the WPI would now be around 115," says the report.

Why Steel Prices Rise

The committee cites four basic reasons for the "extraordinary" behavior of steel prices: 1. "A larger than average rise in wages (from 1953 through 1958, average hourly earnings in steel rose 30.9 per cent compared with 20.3 per cent for all manufacturing)." 2. "A conscious effort on the part of management to maintain and perhaps increase profit margins." 3. "An attempt, largely successful, on the part of management to raise the funds required for expansion through internal sources—retained earnings and depreciation." 4. "A strong and inelastic demand for steel, which allowed price increases to occur without immediate and telling declines in demand."

The committee further concludes: Productivity increases in steel have been moderate (about the same as in manufacturing as a whole), thus removing to a large extent the possibility of the industry absorbing more wage increases itself—rather than passing them along in the form of price increases.

Demand Accounts for Machinery Prices

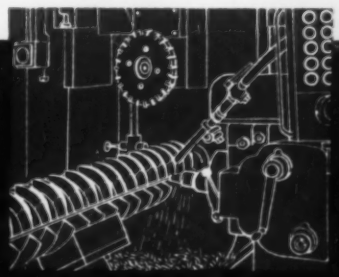
The second committee report on machinery places the blame squarely on demand factors. The report concludes: "Buyer competition allowed the industry to increase its gross margins over cost by substantial percentages" from 1954 through 1957. Two factors had the most influence: 1. The more active a firm was (the more overtime work it did was one criterion), the higher prices rose. 2. The industry as a whole "embarked on a relatively larger capital expansion program than other manufacturing industries."

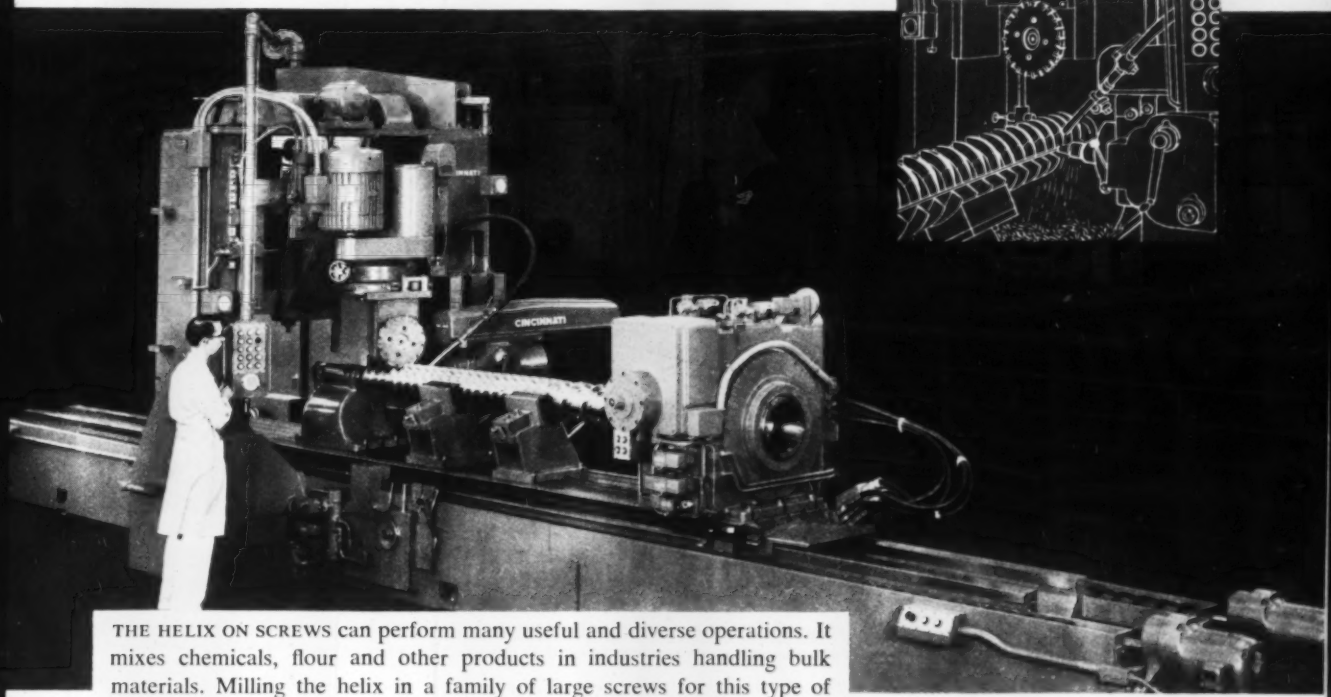
The report (again by a staff economist for the committee) has this to say about machinery prices: "About 20 per cent of the total increase in unit costs in manufacturing in the 1955-57 period was accounted for by rising capital consumption allowances." The report points out higher machinery prices "may tend to be a recurring phenomenon." Reason: During a recession, wage and steel costs tend to catch up with a previous rise in machinery prices, thus setting the stage for further increases in machinery prices in the next period of business expansion.

CINCINNATI

CINCINNATI SPECIAL MACHINE DIVISION

incorporates Dependable Productivity in long *helix milling machine*





THE HELIX ON SCREWS can perform many useful and diverse operations. It mixes chemicals, flour and other products in industries handling bulk materials. Milling the helix in a family of large screws for this type of equipment proved to be too expensive for one machinery builder, so he enlisted the aid of Cincinnati Milling's Special Machine Division. Their specialists developed a machine having a conventional horizontal spindle (standard Hy-Powermatic unit) and a heavy duty 20 hp universal spindle head. The helix is roughed out by the large cutter above the part, and finished with the end mill in the conventional horizontal spindle. Cincinnati's unique Telephase control system operates the fixture rotation in exact relation to table travel, producing an unusual combination of highly accurate right- and left-hand leads.

Giant production lines; big machines having a high degree of "intelligence"; compact, single cycle machines... all are built by Cincinnati and are dependably operating in various plants, producing at the lowest possible cost. Our Field Engineers will be glad to show you what the Special Machine Division can do for you. **Special Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

Deep helix mixing screws, requiring four types of operations, are milled on this CINCINNATI Special Helix Milling Machine. It has the capacity to handle any size screw from 4" to 24" diameter, up to 24 feet long. *(Photo courtesy of Baker Perkins Inc., Saginaw, Mich.)*

SPECIAL MACHINES • COMPLETE PRODUCTION LINES
• VERTICAL AND HORIZONTAL BROACHING MACHINES

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SPECIAL MACHINE DIVISION

M&T's chromate dip finishes protect and beautify at nominal cost

REDS, GREENS, BLUES, GOLDS – these lustrous metallic colors for zinc-plated products join the line of UNICHROME CHROMATE DIPS which also includes chromium-like clear, jet black, and iridescent yellow finishes.

The new dyed chromate finishes are especially suitable for appliance parts, toys and similar items . . . where the eye appeal of a striking metallic tint adds potent sales appeal. Wire objects in particular take on new beauty and at low unit cost. Enthusiastic users of Unichrome Dips have found that their material costs for chromate treating are only a small fraction of a cent per square foot of surface treated.

Along with color goes a high degree of corrosion resistance – the highest among dyed chromate finishes. In salt spray tests, Unichrome Dip Finishes have prevented appearance of white corrosion for as much as 100 hours. A clear lacquer top coat gives a combination finish with excellent wearability . . . as proved by over a dozen years of successful commercial use of clear Unichrome Dip finishes on refrigerator shelves and builders' hardware.

Ask the M&T man to tell you more about these chromate type finishes. Or send for details.

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What's Your Competitive Intelligence?

AN INFORMED COMPANY knows its competition; alert managers accept this as fundamental. The principle is explored in a report, "Competitive Intelligence," prepared by students of the Graduate School of Business Administration, Harvard University. Nearly 300 business executives were contacted by the authors, through personal interviews or questionnaires, as part of the research for their report. In this way, the authors discovered two ways used to collect competitive information: Normal and controversial.

NORMAL SOURCES

• YOUR SALESMEN—Because they are on the scene, they can report on price and products, inform you of expansion of plants or distribution facilities, give immediate notice of sudden price changes or unusual discounts, and collect competitor's product for analysis.

• YOUR MANAGEMENT PEOPLE—By attending conventions, trade meetings, and professional gatherings, your key people can meet their competitive equals and exchange trade and professional knowhow.

• YOUR SUPPLIER (he may also sell to your competitor)—Through his representative you can learn of purchases or orders entered by your competition. This is legitimate sales strategy by the salesman and can be considered as product recommendation.

• OTHER—Consultants, advertising agencies, and marketing organizations are "outside" specialists with information to market.

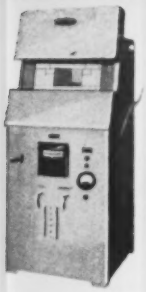
• PUBLICATIONS—Business and trade publications are important. They feature products, facilities, advancements, or discoveries. Financial papers, annual reports, and government publications often provide valuable clues.

CONTROVERSIAL METHODS

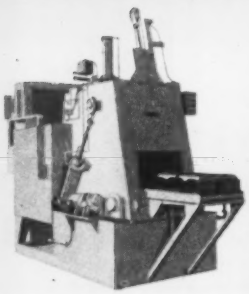
• EMPLOYEE RAIDING—You are subject to raiding by new companies and established operators seeking to buy your product and marketing knowhow and experience. Pirating by newer companies follows this course: Technical and production personnel are usually tapped first; sales executives with large followings are generally recruited later. The older, marginal firm may hit at all quarters, filling its needs as it goes along.

• PATENT INFRINGEMENT—Product and process infringements are a constant threat. The violation is committed with the attitude that the gain is worth the penalty. Product infringements can be detected by careful analysis of the competing item. But process violations are difficult to determine. Often it is necessary to obtain the services of a patent investigator.

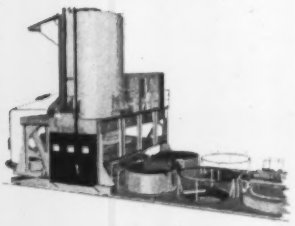
• BUSINESS ESPIONAGE—This approach, though not publicized, nevertheless exists. Your employees are bribed. Agents are placed in your plant. Executives are surveyed. Phones are tapped. War inspired gadgets such as directional and parobolic microphones capable of picking up distant voices are being perfected. Security will be more difficult to maintain.



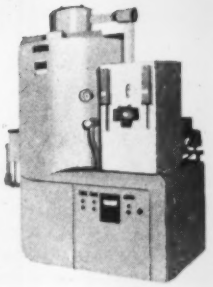
Laboratory Equipment: One-unit box furnace (shown), muffle or for non-oxidizing atmosphere with temperature range to 3000° F.



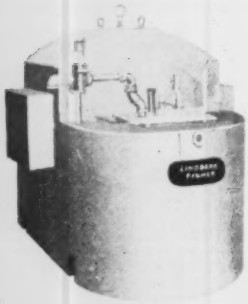
Automatic Carbonitriding Furnaces: Automated integral quench type (shown) with CORRTHERM electric elements.



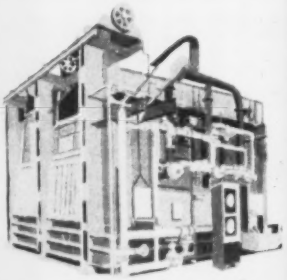
Gantry Type Furnaces: Vertical, controlled-atmosphere, drop bottom, hardening furnace (shown). Complete installation field-installed by Lindberg.



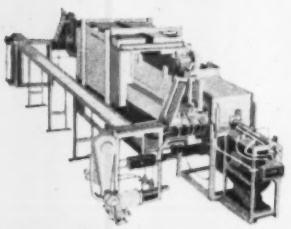
Atmosphere Generators: Hyen generator (shown) for endothermic atmospheres. Generators for all required atmospheres.



Melting and Holding Furnaces: Electric resistance furnace (shown) with capacities of 750 lbs. to 1500 lbs.



Aluminum Reverberatory Furnaces: Twin-chamber melting and holding furnace (shown) with 45,000 lbs. capacity.



Ceramic Kilns: Fully automatic, atmosphere controlled kiln (shown) has 5 control zones for flexibility. Maximum temperature, 2700° F.

Cyclone Tempering Furnaces: Batch type fuel fired tempering furnace (shown). Famous in metal treating industry for years.

When a product needs heat let Lindberg apply it

Applying heat to industry has been our only vocation for many years. When your product needs heat it makes sense to consult the most widely experienced experts you can find. We believe we have them here at Lindberg. First of all, we manufacture a full line of equipment, the most complete in the field; heat treating furnaces, salt bath furnaces, melting furnaces, induction heating units, ceramic kilns, laboratory and pilot plant furnaces—electric or fuel fired, built in our plant or field installed. So, we can recommend just the correct techniques best suited to your individual requirements and your production methods. Then at Lindberg we have an exceptionally creative group of metallurgists, research technicians and engineers, the best in the business, we vow. You can count on them to answer your industrial heating problems satisfactorily, no matter how complex or unusual. Our world-wide organization, with plants and subsidiary companies in many countries, makes this superior service available to you anywhere.

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ENGLAND
Electric Resistance Furnace Company, Ltd.
Weybridge, Surrey

SWITZERLAND
Elco-Industrieofen A.G.
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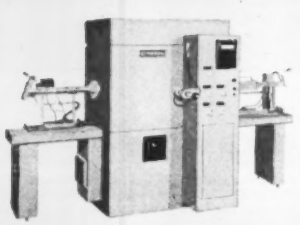
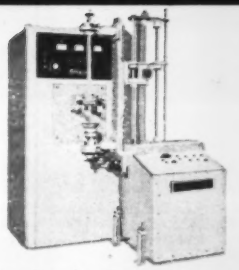
LINDBERG **heat for industry**

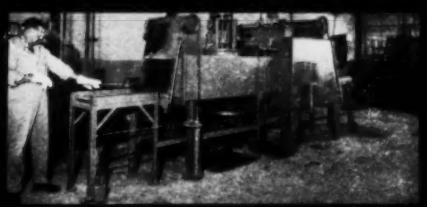


High Temperature Furnaces: New Graphite Tube Furnace (shown) with temperature range 2600° F. to 5000° F. for research and production in metal and ceramic fields.

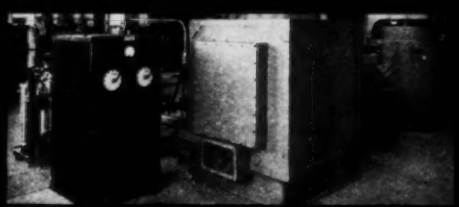


Induction Heating Units: New Lindberg Floating Zone Scanner for precise production of hyperpure semi-conductor materials and metals and Induction Heating Unit (shown).

General view of complete Heat Treating Department at new plant of Lear, Inc., Grand Rapids, Michigan. All equipment including furnaces, Hyen atmosphere generator, control panels, oil quench is by Lindberg.



Electric atmosphere brazing and annealing furnace. Hand pusher type . . . 2100° F. maximum temperature.



Electric pit furnace for treatment of high temperature alloys in dry hydrogen atmosphere. Tap transformer also shown.

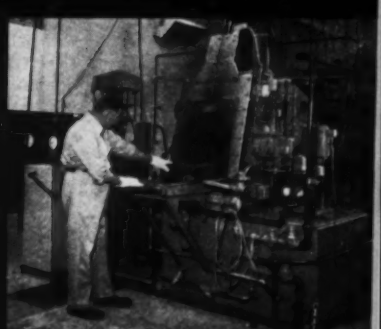
The retort for high temperature pit furnace for treatment of alloys at 2200° F. (left). Production tempering furnace, 22" x 26" work space, shown at right.

Atmosphere tempering furnace, 16" x 24" work space, for both gaseous nitriding and steam treating. One retort in foreground.

LINDBERG Equips Complete Heat Treating Department at Lear, Inc.

The heat treating requirements for the new Grand Rapids plant of Lear, Inc., were put into Lindberg's hands. We supplied them in the way the photographs show. Our engineers cooperated fully with Lear in the selection of the proper Lindberg equipment and the layout of the complete heat treating department. This installation illustrates one of the big advantages of consulting with Lindberg. Our years of experience in all phases of the application of heat to industry, our complete line of all types of industrial heating equipment offer the best assurance that you can coordinate all your needs in one reliable, experienced source. Consult your local Lindberg Field Representative (see classified phone book) or write us direct.

LINDBERG **heat for industry**



Integral quench furnace with CORRTHERM electric heating elements . . . for carbonitriding and general heat treating.

a new, improved ALODINE for aluminum

Cost Saving, Time Saving ALODINE 1200S Pre-Paint Treatment Protects Aluminum Best!

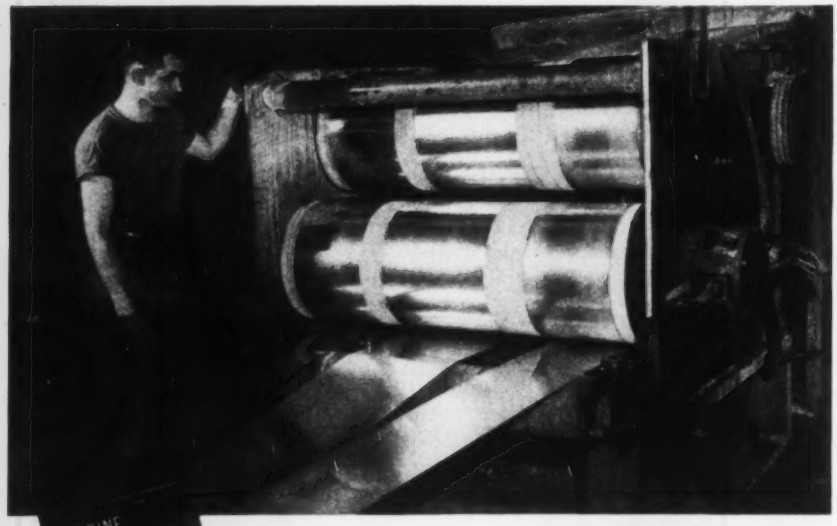
IN LESS TIME—ALODINE 1200S provides increased chemical activity for dramatic reduction in processing time . . . up to 50% in most cases! You get far faster processing than ever before, with the same high quality protection!

WITH LESS EQUIPMENT—You can install an ALODINE 1200S system quickly and conveniently, *without resorting to mechanical bath maintenance!* That means no dangerous, time consuming checking routines with the possibility of bath contamination always present!

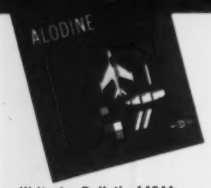
AT LESS COST—ALODINE 1200S can be processed through continuous dip in the same time cycle other conversion coatings require for continuous spray lines! This dip technique reduces initial equipment costs, slashes maintenance costs to a minimum and allows aluminum fabricators to utilize conversion coatings more frequently for a wider range of product applications! Whatever the application method—brush, dip, continuous strip or spray—ALODINE 1200S may be the answer to your production problems.

FOR MORE FLEXIBILITY—Most important, its ease of operation, safety in use and versatility enables ALODINE 1200S to answer one of the most perplexing problems inherent in providing corrosion protection and paint bonding qualities for aluminum—the problem of constant, uniform quality. ALODINE 1200S is qualified under Government Specification MIL-C-5541.

Investigate cost saving, time saving ALODINE 1200S today! And whenever you have a chemical finishing requirement for aluminum—any type of aluminum—there's an ALODINE process available to protect or decorate the metal, and anchor the paint finish more securely.



Typical ALODINE 1200S strip line installation at ALSCO, INC. Strip from aluminum coil is fed into Alodine processing baths where it is cleaned, rinsed, deoxidized, rinsed, coated with ALODINE 1200S, rinsed and given a final acidulated rinse. Strip is then rewound, roll coat painted, roller formed into final shape, backed, inspected and packed for final shipment.



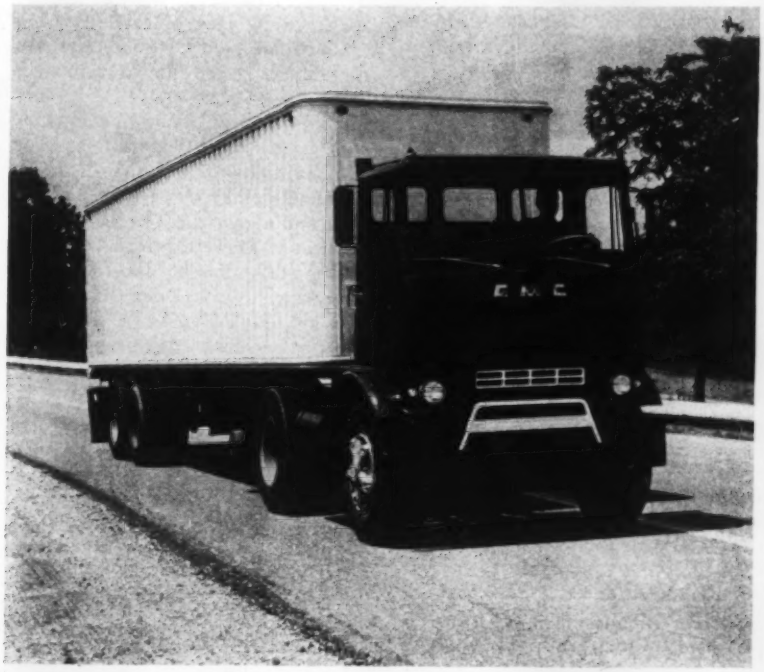
Write for Bulletin 1424A describing use of Alodine for aluminum fabrications of all types.

AMCHEM

ALODINE 1200S

another chemical development of **AMCHEM PRODUCTS, INC., Ambler 27, Pa.**
(Formerly American Chemical Paint Co.)

Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont. Amchem and Alodine are registered trademarks of Amchem Products, Inc.



There's nearly an extra ton of capacity in this truck because...

High Tensile Steels Help Cut Truck Frame Weight

AMONG THE CHANGES in GMC's 1960 truck line are improvements in frame steel that permit the division to reduce side rail weights 18 per cent with no loss of cargo capacity. In many models, load capacity can be increased 300 lb and more. As an option for heavy duty rigs with conventional frames, the division offers a preheat-treated steel frame. Those advances are expected to point the way to further changes in the types of steel used by truck builders. They're only part of the redesign job GMC has done on its 1960 truck lines.

The truck steel story goes back to prewar days when the General Motors division commonly used SAE 1023 killed or semikilled carbon steel for frames. Quality problems often resulted in materials that actually were rim steel quality with 35,000 to 40,000 psi tensile strengths. GMC needed 42,000 to 45,000 psi steel, says H. G. Taracks, division metallurgist.

After the war, the division began working with SAE 950 steels on subassembly parts like engine mounts. Object: To find a steel with greater strength characteristics that could be formed easily. One supplier finally developed a 950 specification that worked particularly well. At the same time, GMC started seeking a material for extra heavy duty frames that would not require costly heat treating and straightening operations after it was formed into side rails. A preheat-treated, low alloy steel seemed to be the answer. By 1957, suppliers had worked up steels in the SAE 8617 range and in a category GM calls 9115 that performed satisfactorily.

• **Stronger**—As a result of material changes and redesign, frames are up to 35 per cent stronger this year and can withstand as much as four times more torsional stress. Light duty models have welded X member and drop center frames fortified with five crossmembers. Two types of box side rail frames support medium duty chassis.

Full depth channel rails serve heavy haulers.

Almost all of the conventional frames use SAE 950 instead of 1023 steel. That permits a reduction from 3/8 to 5/16 in. steel for side rails. Weight savings are 18 per cent. An optional heavy duty frame gives greater fatigue life for special tough duty trucks like garbage carriers and oil tankers. It's formed from preheat-treated steel either in the 8617 or GM 9115 grades. "By heat treating the steel before forming it, we've been able to cut manufacturing costs an estimated 15 per cent," reports Don LaBelle, truck engineer. Tensile strengths are upwards of 70,000 to 75,000 psi for the 950 material and near 100,000 psi for the 8617 and 9115 grades.

• **Fabricated Frames**—While GMC

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
October	507,590	261,701
10 Mo. Totals	4,844,279	3,135,973
November		514,152
December		593,920
Total		4,244,045

Week Ended	1959	1958
Oct. 10	118,793	34,834
Oct. 17	133,480	45,387
Oct. 24	112,488	70,973
Oct. 31	101,616	97,804
Nov. 7	65,369†	125,279
Nov. 14	62,000*	117,688

Source: *Ward's Automotive Reports.*
†Preliminary *Estimated by STEEL.

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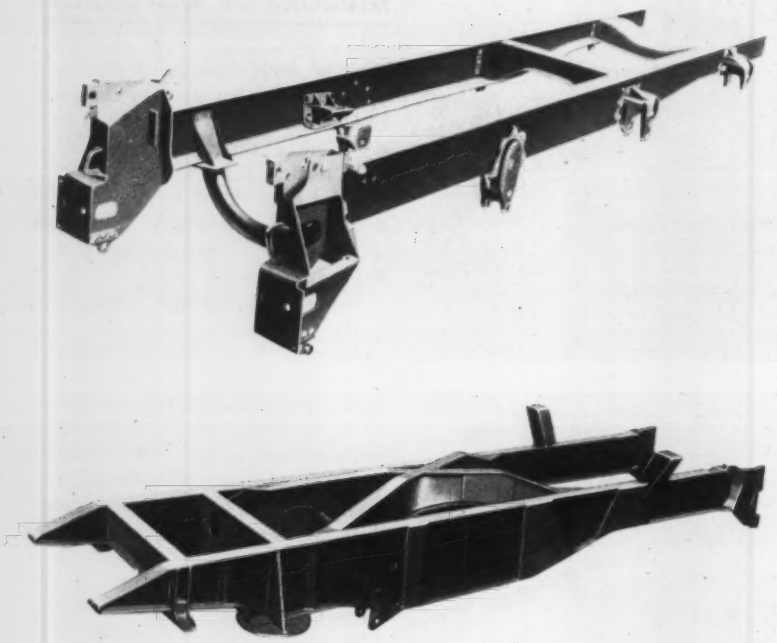


These new GMC truck frames are 35 per cent stronger than other frame designs, will withstand up to four times more twisting stress

was developing tougher steels, its engineers also were designing a new type of flanged frame for its aluminum body tilt cab tractors. They are made from 950 steel and fabricated on an automatic CO_2 welding line. Although it's more expensive than the conventional channel frame, the flanged design reduces frame weight 50 per cent, claims F. C. Fleck, frame project engineer. That is important because the 48 in. tilt cab tractors have a 29,000 lb gross vehicle weight rating. The tougher but lighter frame and cab permits this GMC job to haul up to 1824 lb more payload than comparable models.

• **Other Features**—Besides frames, GMC brings other major design changes to market this year. It offers four basic cab styles. Models range from ½ ton to 120,000 lb gross weight ratings. Biggest story is the new line of V-6 and V-12 gasoline engines. Horsepower ratings range from 150 to 275. Torque output goes from 260 to 630 ft-lb (see STEEL, Aug. 10, p. 95).

Transmissions are simplified so that fewer gear ratios are required, although 12 speed or auxiliary transmissions still are available. Most of the trucks specify four speed shifts. Like its sister truck builder, Chevrolet Div., GMC is introducing independent torsion bar front suspensions in many of its light, medium, and heavy duty models. Lightweight jobs combine the independent front suspension with rear coil springs. Medium and heavy duty single rear axle trucks are using variable rate springs in the rear.

With redesigned trucks, GMC expects to capture a larger share of next year's market which Philip J. Monaghan, general manager, has predicted will reach 1.1 million units compared with this year's anticipated 990,000 sales.

Diesel trucks are another hot item. In 1954, only 8751 diesels were sold in the country. This year, the industry expects to sell 31,000; a 46 per cent hike over sales in 1958.

Sales Reports Are Red Hot

Preliminary sales indicate that 1960 is shaping up as a near record year, but autodom fears that lack of cars will kill off potential buyers' enthusiasm. October's sales figures show why the companies are irked by lack of cars.

Chevrolet says October sales are highest on record for that month. The GM division sold 133,510 cars (23,759 were Corvairs) compared with its previous October record of 126,224 units established in 1953. **Cadillac** delivered 14,407 cars, 30 per cent above the October record it set in 1950. That brings Cadillac's ten month sales to 120,736 units. Says James Roche, general manager: "In all our 57 years in the automobile business, we've never had better acceptance of a new model."

Mercury's October sales rose to 16,691, highest of any month in the last two years. **Chrysler Imperial** sales were 2539 last month compared with 1100 the year before. **Pontiac** sold 44,335 cars to reach its highest month since September, 1955. **Studebaker-Packard Corp.** says first month sales following introduction totaled 12,250 against 6880 for 1958's similar period. S-P now adds that it has enough steel to build through Dec. 18.

Planning a Trip?

You can take it in a brand new Ford. Two weeks' free use of a Falcon, Fairlane, Fairlane 500, Galaxie, Station Wagon, or a Thunderbird is yours if you Beat-the-Experts at predicting U. S. passenger car production for the first six months of 1960.

The five next best guessers will win full color prints of a futuristic dream car conceived and rendered for STEEL's contest by Virgil Exner, Chrysler Corp. vice president and director of styling. See the Servicenter, Page 5, for rules and an entry blank.

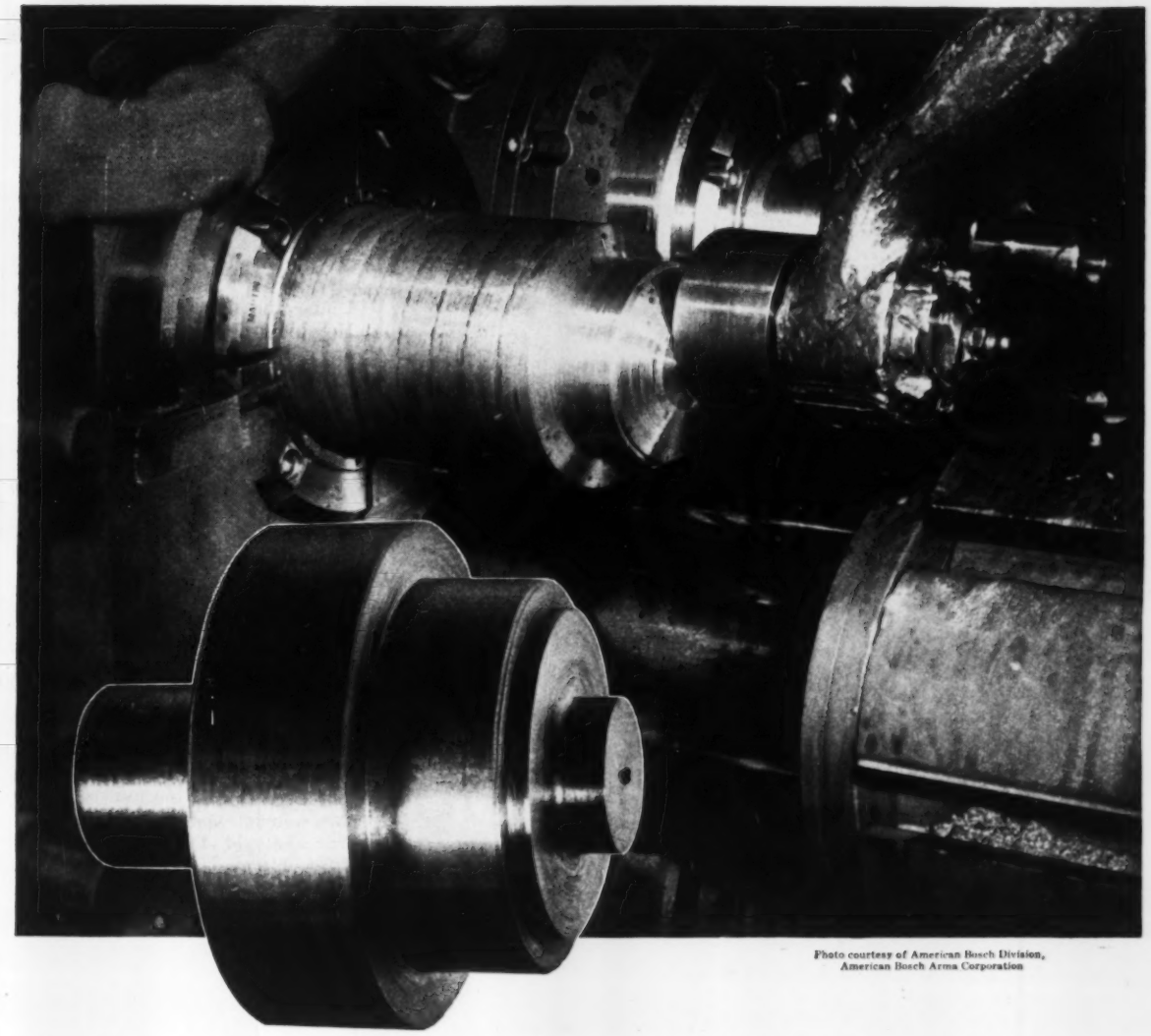


Photo courtesy of American Bosch Division, American Bosch Arma Corporation

Leaded Nitralloy Takes a Big Bite Out of Machining Time!

By switching to Nitralloy Leaded for this hydraulic head, secondary lathe operations and expensive heat treatment were completely eliminated. Produced in a single machining operation, the part is now sent directly to the grinding department. Spindle speeds and feeds were also increased.

For complete information about other fast-machining Aristoloy leaded steels or standard carbon, alloy and stainless grades, call the Copperweld representative in your nearest large city. Or write for booklet entitled, "A Complete Line of Leaded Steels," and NEW PRODUCTS & FACILITIES CATALOG.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4005 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

Where to look for hidden savings

- **Fastener value-analysis shows big dollar savings**
- **Quality improved at same time**

If you know what to look for, there are sizable savings to be found in standard fasteners. See what happened when the *RB&W Fastener Man* analyzed fastener usage:

Shown the merits of high strength bolts, a company standardized on them exclusively, saved $12,000 the first year, $28,000 the next.

Showing a manufacturer how to substitute high strength bolts for heavy head milled bolts, the RB&W Fastener Man pointed to a $4,500 annual saving on this item alone.

At a plant with 23,000 different fastener items in inventory, more than half were eliminated...cutting costs from buying to assembly.

Where special fasteners were used in heavy equipment, substituting cap screws offered $13,000 saving on a production run of 500 units.

So it goes. Using high carbon cap screws where costlier socket screws are not really needed . . . cap screws for studs and nuts in certain applications . . . replacing machined parts with cold headed pieces . . . there are plenty of ways to economize.

Take a look at your own fastener usage through the eyes of an RB&W Fastener Man. Contact Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

RB&W
115th year

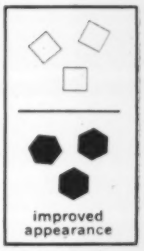
Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**

HEX and HEX: a major step in fastener simplification

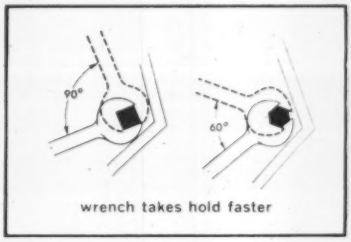
Under the new, RB&W Hex and Hex program, one hex head bolt and hex nut consolidates the best features of four other frequently used fastening units, all of which are intended to do the same job.

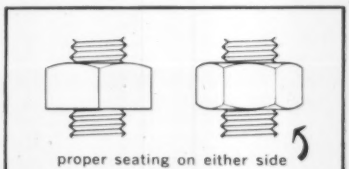
Simplifies inventory, speeds turnover. Streamlines ordering, stocking and usage.

Improves quality and appearance in the popular size range. In heading hex bolts, flow lines in the steel are distorted less than in square bolts. Strength is greater, tolerances closer. Hex heads are more attractive, too.



Cuts weight, reducing handling costs. For example, 1,000 Hex and Hex units in the ½" x 2" size weigh 25 lbs *less* than comparable square head bolts and square nuts.

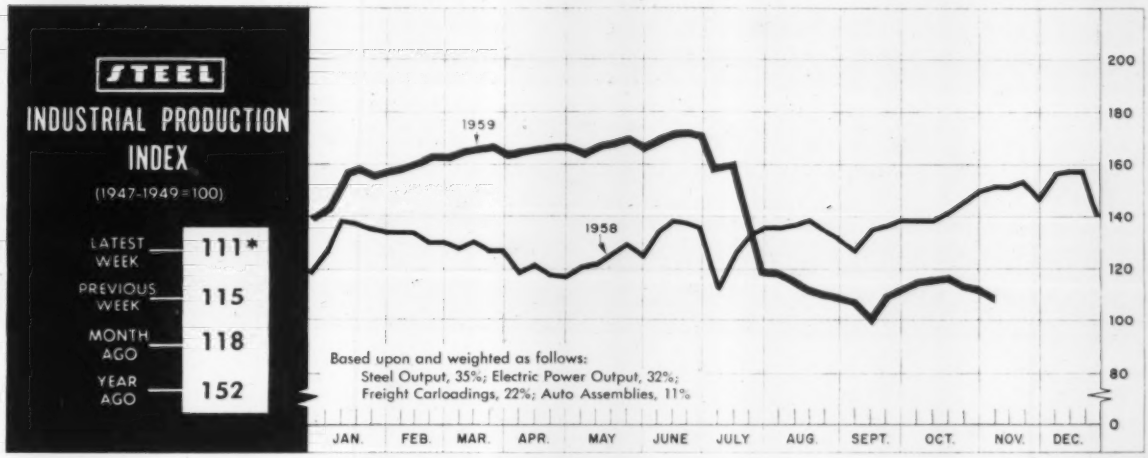




Speeds assembly. Hex permits faster, easier wrenching. Double chamfered hex nuts allow correct assembly from either side.

Cost no more than square head bolts and square nuts. Yet, look at the advantages. Ask the RB&W Man about it. Or, write for Bulletin HH-1.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY



*Week ended Nov. 7.

Indicators to Start Up—at Last

FOR THE FIRST TIME in nearly five months, the economic outlook is decidedly brighter. No matter when the nation's steel mills return to normal production rates, the business trend is bound to start up before the 80 day injunction period is over.

The general decline was slow—hardly visible—during most of the strike. The rise will be almost as subtle, and for diametrically opposite reasons. When the mills were down, metal fabricating continued at a high rate. But now that the mills are starting back up, fabricators are going down and will continue to do so for several weeks.

• **How It Works**—STEEL's industrial production index illustrates how the recovery is shaping up. The first component to start up is railroad freight carloadings. The roads were set to move iron ore and coal the minute the injunction was issued. In addition, the mills lost no time in shipping what little steel they had on their floors when the strike hit. The second component to start up is output of electricity. The steel mills should consume somewhat more power than the amount which will be lost through fabricating plant shutdowns. Both uptrends should be apparent in the statistics for the week ended Nov. 14.

Lagging only a few days is the uptrend in steel production itself. STEEL estimates that the operating rate for the week ended Nov. 15 was about 40 per cent of capacity compared with about 13 per cent prevailing in recent weeks. Much of the increase was accounted for by electric furnaces which were the first to start up after the recall went out on Nov. 7. The buildup may hit about 60 per cent this week.

The three expansive forces in our index will be held in check by further cutbacks in auto production. General Motors Corp. is practically closed down (some Corvair production was being maintained at latest

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	1,133[1]	368	2,011
Electric Power Distributed (million kw-hr)	13,000[1]	12,978	12,311
Bituminous Coal Output (1,000 tons)	8,075[1]	8,100	8,791
Crude Oil Production (daily avg—1,000 bbl)	6,875[1]	6,887	7,003
Construction Volume (*ENR*—millions)	$251.9	$318.5	$221.5
Auto, Truck Output, U. S., Canada (*Ward's*)	83,916[1]	124,333	158,138
TRADE			
Freight Carloadings (1,000 Cars)	590[1]	588	658
Business Failures (Dun & Bradstreet)	273	250	299
Currency in Circulation (millions)[3]	$31,920	$31,873	$31,419
Dept. Store Sales (changes from year ago)[3]	+7%	+7%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,541	$25,512	$21,712
Federal Gross Debt (billions)	$291.2	$291.8	$280.2
Bond Volume, NYSE (millions)	$26.2	$32.2	$29.5
Stocks Sales, NYSE (thousands of shares)	13,884	19,105	15,920
Loans and Investments (billions)[4]	$104.3	$104.6	$93.9
U. S. Govt. Obligations Held (billions)[4]	$28.2	$28.5	$31.6
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	227.8	226.5	217.2
All Commodities[7]	119.2	119.3	118.7
Commodities Other than Farm & Foods[7]	128.6	128.6	126.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

WHAT'S
DIFFERENT
ABOUT
BRMCO

If you buy aluminum, brass or bronze in strip and rolls, you may think all suppliers are alike. They're not. No one supplier can be all things to all people, and few try. If you are the type of buyer who looks for something a little "extra" in quality, workability and service, you might make it a point to learn more about BRMCO. With BRMCO metals, uniformity of width, gauge and grain size results in greater efficiency and lower metal working costs. For example, BRMCO can hold temper tolerances to within plus or minus 3 points on the Rockwell scale.

Apart from just plain better quality metals, you can count on these "plus" services: *specific date delivery, even special packaging or shipping arrangements to suit your individual requirements.*

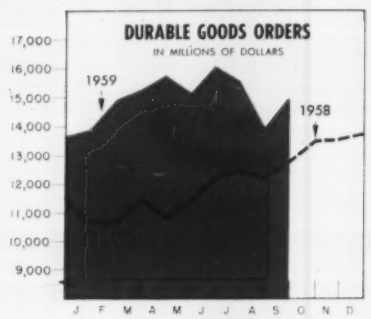
The man from BRMCO can tell you the rest of the story, including information on our own special alloys for unusual requirements.

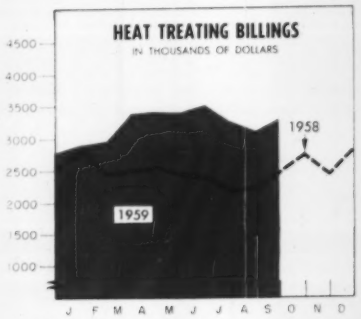
We'll be happy to send you samples for your own testing and analysis. Simply write, or call collect.

BRMCO

Bridgeport Rolling Mills Company
BRIDGEPORT, CONNECTICUT
Subsidiary of Atlantic Coast Industries, Inc.
FINE QUALITY ALUMINUM, BRASS AND BRONZE IN STRIP AND ROLLS

THE BUSINESS TREND





	New Orders* 1959	New Orders* 1958	Sales* 1959	Sales* 1958
Jan.	13,900	10,704	13,541	12,646
Feb.	14,918	10,688	13,870	12,038
Mar.	15,323	11,488	14,400	11,670
Apr.	15,796	10,833	15,166	11,532
May	15,241	11,423	15,515	11,643
June	16,133	12,245	15,771	12,086
July	15,493	12,512	15,384	12,256
Aug.	13,974	12,177	14,008	12,385
Sept.	15,018†	12,859	14,115†	12,723
Oct.	.....	13,530	.....	12,943
Nov.	.....	13,574	.....	13,295
Dec.	.....	13,673	.....	13,613

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.
Charts copyright, 1959, STEEL.

	1959	1958	1957
Jan.	2,915.5	2,825.5	3,533.9
Feb.	2,976.0	2,466.3	3,378.9
Mar.	3,397.3	2,490.5	3,631.8
Apr.	3,420.6	2,538.0	3,572.4
May	3,405.6	2,421.5	3,389.6
June	3,518.5	2,367.3	2,912.1
July	3,259.7	2,141.5	2,767.5
Aug.	3,111.3	2,212.9	2,830.8
Sept.	3,285.7	2,456.9	2,765.0
Oct.	.....	2,744.9	3,076.2
Nov.	.....	2,422.0	2,677.2
Dec.	.....	2,799.4	2,579.3

Metal Treating Institute.

report), and both Ford Motor Co. and Chrysler Corp. are as much as 50 per cent under October scheduling. The injunction came too late to prevent further schedule cuts in the Big Three, but it was issued in plenty of time to permit full production at the Little Two the rest of the year.

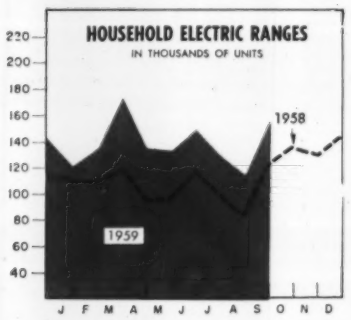
• **Net Result**—It's almost a sure bet that the preliminary reading of 111 (1947-49=100) for the week ended Nov. 7 will be the low point of the strike period (except for holiday weeks). Even if furnace damage and worker slowdowns prevent the steel operating rate from climbing much above the 60 per cent level, the improvement in STEEL's production index should be about 40 points.

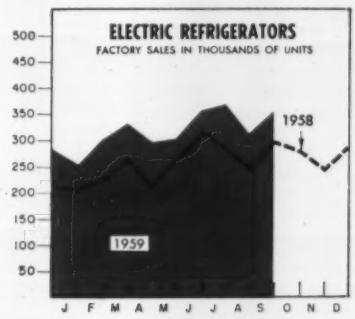
Demand Remains Strong

Evidence is piling up that there is nothing wrong with the basic demand for goods. Only the production has been interrupted. After a dismal showing in August, manufacturers' new orders for durable goods bounced back by more than $1 billion (seasonally adjusted) while shipments of durables held close to the depressed August rate. (See graph and table above.) A strong rise in orders for nondurables lifted total manufacturers' orders to $30.6 billion, only slightly below the year's high of $30.8 billion in July.

Nor does the success of the 1960 model autos leave much to be desired from the demand angle. *Ward's Automotive Reports* says last month's sales were the best for any October since World War II. Dealers sold more cars than the producers assembled, resulting in a drop in inventories from 612,000 units at the beginning of October to 575,000 units on Nov. 1.

After looking at the demand factors still acting on the economy, Martin Gainsbrugh, chief economist of the National Industrial Conference Board, declares: "There are still compelling reasons for believing that whatever further hesitancy may develop in the weeks immediately ahead, the recovery-prosperity trend should again prevail once steel production is resumed and carry over well into 1960, if not beyond. Underlying this conclusion is the strength of end-product demand by consumers, industry, and government alike . . . Viewed retrospectively, we may find that the production restraints of the strike served to prolong rather than foreshorten





Total Factory Sales—Units

	1959	1958	1957
Jan.	120,800	109,000	144,500
Feb.	134,600	108,700	127,700
Mar.	172,600	117,900	139,400
Apr.	136,100	95,600	107,200
May	133,400	96,000	93,600
June	151,400	116,800	102,300
July	129,200	98,500	88,700
Aug.	116,600	81,400	85,800
Sept.	157,200	121,800	124,800
Oct.	.....	135,500	120,400
Nov.	.....	129,400	116,800
Dec.	.....	143,900	113,800
Totals	.....	1,354,500	1,365,000

National Electrical Mfrs. Assn.

	1959	1958	1957
Jan.	256,200	206,100	305,400
Feb.	306,200	227,800	298,700
Mar.	333,700	261,100	309,300
Apr.	301,000	210,800	281,600
May	308,200	262,900	303,700
June	361,000	316,300	305,100
July	370,800	279,700	318,000
Aug.	314,100	245,900	240,500
Sept.	355,700	295,200	265,200
Oct.	.....	277,500	261,500
Nov.	.....	245,500	246,400
Dec.	.....	286,900	214,600
Totals	.....	3,116,700	3,350,000

National Electrical Mfrs. Assn.

the prosperity phase of this present cycle."

Recession Possibilities Down?

If the present business cycle is advanced far enough, it may minimize, or even eliminate, the recession many economists have pegged for 1961. Reason: Significantly higher demand from a growing population and increasing household formations. Government statistics show that the marriage rate is increasing because of the "baby boom" which began 18 or 19 years ago. The number of marriageable young people will increase rapidly from now until the mid-'60s, with only a brief pause in 1962 and 1963—traceable to World War II.

But this does not necessarily mean a decline in births. The rate so far this year is about 4.3 million (a record) despite the low number of marriages during last year.

Historically, as population and family formations increase, so does demand. If demand comes close enough to matching today's capacity to produce, manufacturers will have to consider an early start for their expansion plans to meet the needs of the soaring sixties. Result: An unusually short recession or no recession at all.

Marketer Sees Prosperity

W. W. Morris, director of market research at Westinghouse Electric Corp., told the recent Pitt Conference on the Business Outlook that the high demand of consumers, industry, and government will sustain his company's business at high levels through 1961 at least. The composite trend line for eight major sectors covering the firm's 98 product markets (a good cross section of American goods) is seen rising to an all-time high next year and remaining there in 1961.

Of the eight sectors, Mr. Morris sees all but the defense and export markets rising in 1960. While exports will continue a gentle downtrend in 1961, he notes a recovery in defense two years from now. The only other downtrend in his outlook is a slight one for consumer markets in 1961 following a 7 per cent gain next year.

Other market areas which will support an uptrend for electrical goods in the next two years are: Construction, despite a decline in housing; parts and repairs; materials and components; industrial; and utilities.

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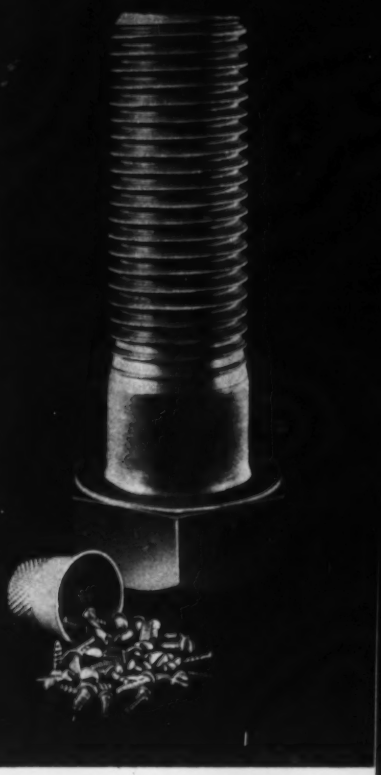
. . . every fastener need



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This is part of the reason why Sandvik steels have the special physical stamina to give consistent performance in such critical applications as flapper valves, instrument springs, shock absorbers, surgical instruments, unbreakable watch mainsprings, piston ring segments and expanders, etc.

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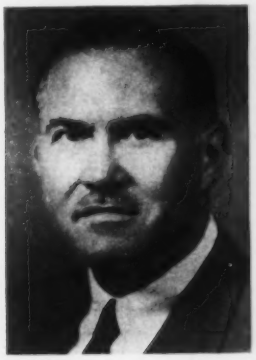
J. I. Case exec. v. p.

JAMES E. BORCHERT
A. O. Smith procurement

GEORGE H. WEISS
Alcoa pig-ingot sales mgr.



WILLIAM E. CLARK
Dravo president

John H. Brinker resigned as vice president and general manager, Permaglas Div., A. O. Smith Corp., to accept the post of executive vice president of **J. I. Case Co.**, Racine, Wis.

James E. Borchert was appointed director of procurement for **A. O. Smith Corp.**, Milwaukee. He succeeds **Milton E. Morgan**, a company vice president, in the purchasing post. Mr. Morgan was placed in charge of the Permaglas Div., Kankakee, Ill.

William M. Grimes was elected president, **Gartland Foundry Co.**, Terre Haute, Ind. Formerly vice president, he continues as general manager.

Ralph E. Stops, vice president of **Jorgensen Conveyors Inc.**, Chicago, was named general manager of the firm. **Charles E. Jorgensen** was made purchasing agent and production control supervisor. **J. W. Doornbos** was made plant superintendent.

James G. Weldon was made manager, Hydraulic Dept., Bendix-Pacific Div., **Bendix Aviation Corp.**, North Hollywood, Calif. He will handle engineering, manufacturing, and sales operations for the firm's hydraulic products. **Frederic C. Weyburne** was made assistant group executive of the corporation, in charge of six manufacturing divisions.

Robert J. Saggau was made product sales manager of **Spincraft Inc.**, Milwaukee.

George H. Weiss was made manager of pig and ingot sales for **Aluminum Co. of America**, Pittsburgh. He was assistant manager of wire, rod, and bar sales.

Iden F. Richardson was appointed manager of **Hughes Products Group**, Hughes Aircraft Co., Culver City, Calif. He succeeds **Raymond B. Parkhurst**, who resumes his former post of vice president-manufacturing. Mr. Richardson joined Hughes last August after 23 years with Bendix Aviation Corp.

John C. Cleeves joined **Pangborn Corp.**, Hagerstown, Md., as development engineer, Dust Control Div. He specialized in industrial dust and fume control problems with companies in England.

Robert K. Miller, president of Holly-General Div., **Siegler Corp.**, Pasadena, Calif., was elected a vice president of the parent corporation. He continues to head the division.

E. R. Baetzel, as marketing manager, heads a newly formed general sales marketing section at **Brown Trailer Div.**, Michigan City, Ind., Clark Equipment Co. He formerly handled division marketing studies.

Arthur B. Horton was elected chairman, **Chicago Bridge & Iron Co.**, Chicago, succeeding his father, the late **Horace B. Horton. E. E. Michaels**, CB&I president, was designated chief executive officer and **R. F. Hendren** was named executive vice president and treasurer.

William E. Clark was elected president and chief operating officer, **Dravo Corp.**, Pittsburgh. He succeeds **Carl B. Jansen**, elected chairman and chief executive officer. Mr. Jansen succeeds **William K. Fitch**, who retires Dec. 1. Mr. Clark was executive vice president.

William T. Warrender joined **Globe-Union Inc.**, Milwaukee, as vice president in charge of administration for the Battery Div. He was general projects manager of Radio Corp. of America's electronic components and international divisions at Camden, N. J.

Jack T. Putnam was appointed general sales manager, Western Div., **Kaiser Refractories & Chemicals Div.**, Kaiser Aluminum & Chemical Corp. He continues headquarters at Oakland, Calif., where he served as western regional sales manager. **Hal F. Randolph** was made general sales manager; **Robert L. Petersen** assistant general sales manager at the division's Central Div. They have headquarters at Mexico, Mo.

J. K. Lund was appointed vice president, Research & Development Div., **Dole Valve Co.**, Morton Grove, Ill. He was vice president and director-technical services.

Howard D. Tindall joined **Delta-Star Electric Div.**, Chicago, H. K. Porter Company Inc., as manager of transformer sales and engineering. His headquarters are in the division's Electric Service Works, Philadelphia. Mr. Tindall was manager of small power transformer

JOHN ARNOLD

ROBERT R. HILL

Lee Wilson Engineering posts

EDWARD J. FERRIS JR.

EARL R. LEWIS JR.

promotions at Pratt & Whitney

sales for Pennsylvania Transformer Co.

John Arnold, former chief engineer, was promoted to the new post of manager of engineering and new products by **Lee Wilson Engineering Co. Inc.**, Cleveland. **Robert R. Hill**, formerly an assistant to Mr. Arnold, was made chief engineer. **Robert J. Beemer** was named assistant chief engineer.

Frank S. Bosley, vice president-manufacturing and engineering, **Gates Rubber Co.**, Denver, was named executive vice president in charge of manufacturing.

Tube Turns Div., Chemetron Corp., named **James M. Gloor** works manager for its main plant in Louisville, freeing **John A. Henby**, vice president-production, for new responsibilities related to current and future manufacturing operations. **Morry T. Wakefield**, industrial relations director, succeeds Mr. Gloor as production superintendent. **Henry H. George** was made chief engineer, product engineering and research. **Max B. Densford** succeeds Mr. Wakefield as personnel manager.

Harold C. Cook and **John C. Guenther** were appointed to the staff of B. W. Bogan, vice president, **Chrysler Corp.**, Detroit. **Richard D. Morrison** was made purchasing agent for raw materials. Mr. Cook, former director of purchasing for the car and truck assembly group, will co-ordinate divisional with corporate purchasing activities. Mr. Guenther, former executive assistant to the general manager, Plymouth-De Soto-Valiant Div., will work on special assignments.

Vitro Chemical Co., newly formed subsidiary of Vitro Corp. of America, New York, elected three vice presidents: **Richard C. Cole** in charge of manufacturing; **Paul R. Kruesi**, research and development; **Malcolm H. McAllister**, sales.

Donald H. Schmuck was made New York district sales manager, **Granco Steel Products Co.**

Edward J. Ferris Jr. was named factory manager; **Earl R. Lewis Jr.** production manager at **Pratt & Whitney Co. Inc.**, West Hartford, Conn. They will co-ordinate manufacturing and production department activities within the machine tool, cutting tool, and gage divisions.

William H. Devonshire was named to the new post of manager-commercial development, **Columbus McKinnon Chain Corp.**, Tonawanda, N. Y.

Geo. Worthington Co., Cleveland, appointed **A. J. Rosalina** as a buyer, specializing in tool purchases. He was eastern district sales manager.

J. P. Craven was elected a vice president, **Babcock & Wilcox Co.**, in charge of the Boiler Div.'s manufacturing department in Barberton, Ohio. He succeeds **Paul H. Setzler**, resigned. **O. R. Carpenter** was made assistant vice president, reporting to Mr. Craven.

Robert H. Bragg was named pro-

JAMES M. GLOOR

MORRY T. WAKEFIELD

Tube Turns works mgr. and production supt.

J. P. CRAVEN

O. R. CARPENTER

B&W Boiler Div. appointments

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VACUUM MELTED FINISHING ROLLS

Here are the rolls which have cut repolishing time in half... lasted 33% to 50% longer on the mill between grinds... produced a finer finish using same polishing procedure as competitive rolls. They are made from consumable electrode, vacuum arc melted Midvac Steels with super uniformity of fine grain structure... and have maximum freedom from defects and non-metallic inclusions. The exclusive Micro Lustre* finish of these rolls assures rolling free of surface imperfections... quicker repolishing... longer trouble-free service between grinds.

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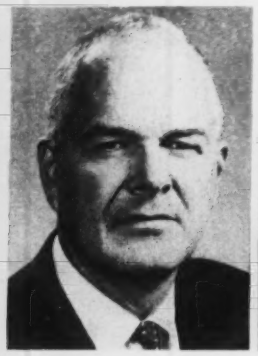
R. W. HOWELL
heads Unarco steel div.

HOWARD B. MYERS
TP&C vice president

H. L. KENAGY
Sheffield plant purchasing dir.



C. E. HUDDLESTON
Cleveland Punch & Shear eng.

C. FRED BORDEN
Kaiser Steel exec. v. p.

HOWARD W. BRANDT
New York Air Brake v. p.

duction control manager, **Leschen Wire Rope Div.**, St. Louis, H. K. Porter Company Inc.

C. E. Huddleston, recently made chief engineer, was elected executive vice president, **Cleveland Punch & Shear Works Co.**, Cleveland.

C. Fred Borden was appointed executive vice president, **Kaiser Steel Corp.**, Oakland, Calif. He was general sales manager.

Everett E. Cox was made superintendent at the Midland, Pa., Works, Titanium Div., **Crucible Steel Co. of America**. He is replaced as superintendent of production at the division by **Jay J. Patten**, former assistant superintendent.

W. Blake Dodds was made vice president-general manager, **Perfect Circle Co. Ltd.**, Toronto, Ont.

M. H. Priddy Jr. was made sales manager, **Gas Atmospheres Inc.**, Cleveland. He was assistant sales manager.

Howard W. Brandt, general manager, Hydreco Div., Kalamazoo, Mich., **New York Air Brake Co.**, was promoted to vice president of the company. He continues direction of the Hydreco Div.

Ellwood F. Curtis, financial vice president of **Deere & Co.**, Moline, Ill., was elected executive vice president. **Maurice A. Fraher**, vice president-tractor production, retires but continues as a member of the advisory committee. **George T. French**, vice president-implement production, was elected to the new post of vice president-manufacturing, responsible for tractor and implement production.

Stephen P. Sanders was made chief of the Environmental Testing Laboratory at **Bendix Products Div.-Missiles**, Mishawaka, Ind., Bendix Aviation Corp.

Fred N. Hurst was named plant engineer for **Raytheon Co.'s** Semiconductor Div. plant now under construction at Lewiston, Maine.

R. W. Howell was made general manager, Equipment Steel Products Div., **Union Asbestos & Rubber Co.** He heads manufacturing operations of steel products at the Blue Island, Ill., plant. Mr. Howell was works manager of Highway Trailer Co. Inc.

Howard B. Myers was elected a vice president, **Tennessee Products & Chemical Corp.**, Nashville, Tenn. He continues in charge of metallurgical sales. TP&C is a subsidiary of Merritt-Chapman & Scott.

H. L. Kenagy was appointed director of purchases for three plants of **Sheffield Div.**, Armco Steel Corp., situated at Kansas City, Mo.; Sand Springs, Okla.; and Houston. He was purchasing agent, Kansas City Works. **J. A. Street** was made assistant director of purchases for the plants, and continues as manager of scrap purchases for the entire division. **R. M. Fletcher** succeeds Mr. Kenagy.

James W. Hosler was made general sales manager, **American-Standard Industrial Div.**, Detroit, American Radiator & Standard Sanitary Corp. The division has plants in San Leandro, Calif.; Columbus, Ohio; Kewanee, Ill.; Dearborn, Mich.; and Buffalo. Mr. Hosler was marketing manager for Kewanee and Nesbitt product lines.

Robert A. Franklin was appointed engineering manager, **Stromberg-Carlson Div.**, San Diego, Calif., General Dynamics Corp. He was regional manager of Radiation Inc.

OBITUARIES...

Paul V. Galvin, 64, chairman, **Motorola Inc.**, Chicago, died Nov. 5.

John G. Berry, 45, president, **Berry Steel Co.**, Roselle, N. J., died Nov. 2. In 1950, he founded Kenilworth Steel Co. which subsequently became a division of Jones & Laughlin Steel Corp. He founded Berry Steel two years ago.

Edward L. Lind, 51, general superintendent, **Clayton Mark & Co.**, Evanston, Ill., died Nov. 1.

Charles J. Weber, 75, cofounder and president, **Chicago Gear Mfg. Co.**, Chicago, died Oct. 31.

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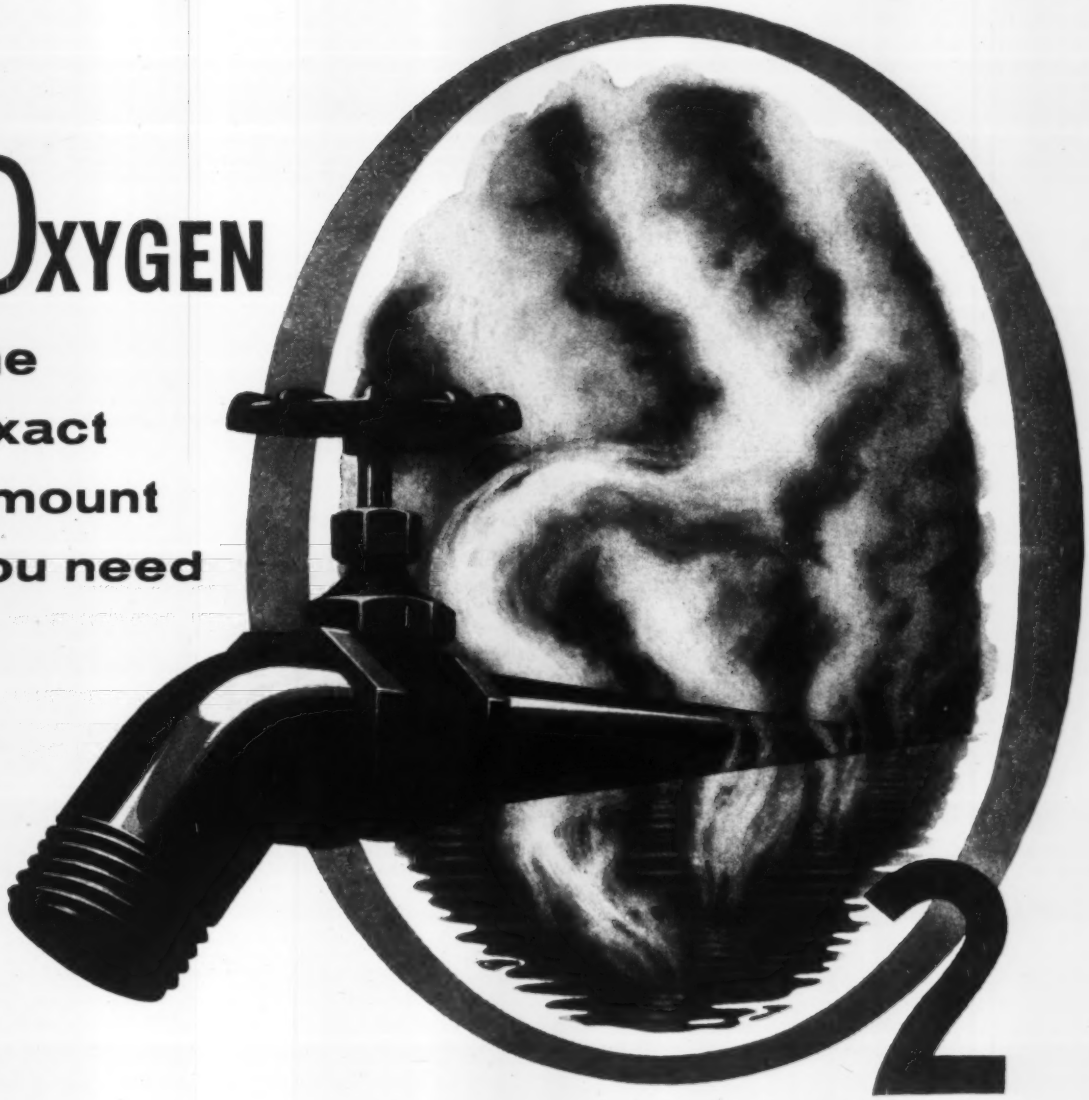

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Ravioli is destined for even greater popularity . . . thanks to this unique "mechanical chef".

With it, volume production is possible—quality can be easily maintained. The operator simply fills the hoppers—the "chef" automatically rolls the dough, inserts the stuffing, shapes and cuts the ravioli...at *18,000* pieces per hour. Dough thickness and stuffing quantity can be precisely controlled for uniform taste and peak flavor.

Stainless steel is specified for all working parts . . . to assure purity, meet sanitary codes. Stainless provides corrosion resistance, easy cleaning—and economy, through trouble-free operation and extended life. The ravioli "chef" is made of stainless steel rounds, squares, flats, sheets—even *welded* and *seamless* tubing. And every bit of stainless is obtained *overnight*—from Frasse.

It pays, when you're working with stainless, to work from Frasse stocks. Frasse carries every rolled form—in a wide range of sizes and analyses... delivery is immediate. You'll like the freedom of choice Frasse stainless stocks provide...find satisfaction in having a reliable source for *everything* in stainless. Call us.

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Bars	**Tubing**
Forgings	**Pipe**
Sheets	**Wire**
Strip	**Fittings**
Plates	**Valves**

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YS&T to Make Galvanized Sheets at Indiana Harbor

YOUNGSTOWN Sheet & Tube Co.'s expansion program at its Indiana Harbor (Ind.) Works (STEEL, Nov. 9, p. 99) will include installation of the company's first continuous galvanizing line. The hot dip galvanizing line is designed to produce coil and cut sheets, delivering the product at the rate of 400 fpm. It will finish the material in thickness from 14 to 30 gage.

The Sendzimir type line will be capable of producing coils 58 in. in diameter, weighing 30,000 lb. If required, it can deliver cut sheets from 48 in. wide and up to 22 ft long. Mechanical equipment for the line will be furnished by Wean Engineering Co., Warren, Ohio. General Electric Co., Schenectady, N. Y., will furnish the power equipment.

• **Cold Reducing Mill**—Now being built by Mesta Machine Co., Pittsburgh, the six-stand, cold reducing mill will deliver coils up to 46 in. wide and 80 in. in diameter, weighing more than 62,000 lb. The electrical power drive is being built by Westinghouse Electric Corp., Pittsburgh.

• **Coke Ovens** — Another project under the program is construction of a battery of 87 coke ovens having a daily coking capacity of 1450 tons. Koppers Co., Pittsburgh, will build the battery.

• **Finishing Equipment**—Additional equipment for finishing seamless tubing will consist of facilities to speed the flow of finished materials and tooling to produce a full range of seamless pipe diameters from 4½ to 9⅝ in. Opened in 1957, the mill has produced pipe with a maximum diameter of 8⅝ in. New finishing equipment will include additional threading machines; a hydraulic tester; a weighing, measuring, and stenciling machine; and a coupling and screw-up machine.

Forms Refractory Firm

Harbison - Carborundum Corp. has been organized by Harbison-Walker Refractories Co., Pittsburgh, and Carborundum Co., Niagara Falls, N. Y. The joint subsidiary will own and operate Carborundum's recently expanded Monofrax fused refractory plant at Falconer, N. Y. Additional facilities are contemplated for the manufacture of chromite magnesia base fused refractories.

Enlarges Tubing Mill

Columbia Steel & Shafting Co., Carnegie, Pa., is erecting a 25 per cent addition to the Scottdale, Pa., plant facilities of its Summerill Stainless Tube Div. The mill, opened two years ago, manufactures cold drawn stainless tubing in sizes ¼ to 1¼ in. OD.

Widens Sintering Services

Firth Sterling Inc., Pittsburgh, is operating separate and complete tungsten carbide sintering facilities at its McKeesport, Pa., plant to service the Pittsburgh area. Similar facilities have been established in Hartford, Conn.; Detroit, Houston, and Los Angeles to meet emergency service requirements that cannot be met on a regular mill production basis. James Campbell is in charge of the Pittsburgh plant.

Lukens Exercises Option

Lukens Steel Co., Coatesville, Pa., has purchased its World War II facilities and equipment installed by the Navy during 1941-42. The facilities include a 120-in., four high, plate rolling mill; additions to Lukens' 206 in. mill; open hearth and heat treating facilities. The purchase price was $4,995,093.

Enters Ventilator Field

Ventilator Div., Swartwout Co., Cleveland, has been purchased by a group headed by G. V. Patterson, former Swartwout vice president. The new company, Swartwout Fabricators Inc., is transferring manufacturing operations to 100 E. North St., Kokomo, Ind. Administrative and sales offices will remain at 18511 Euclid Ave., Cleveland 12, Ohio. Officers include: President, G. V. Patterson, and vice president-manufacturing, John Real. R. E. Parshall is sales manager.

Builds Electrostatic Unit

Metal Products Div., Koppers Co., Pittsburgh, is fabricating at its Baltimore shops an electrostatic precipitator for cleaning blast furnace gas at the South Works, South Chicago, Ill., of U. S. Steel Corp. The unit is designed to handle 53,200 cfm of dust laden gas and to remove 95 per cent of the particulate matter in the gas stream.

Opens Container Plant

Vulcan Containers Pacific Inc. has started operations in a 25,000 sq ft plant at 2424 Merced St., San Leandro, Calif. The firm is producing steel shipping pails in capacities ranging from 2½ to 6½ gal. and round tin plate cans in a wide variety of sizes from 1 lb through 25 lb capacities. Officers of the new firm include L. M. Ferguson, president and sales director; V. I. McCarthy Jr., executive vice president; R. E. Smith, operational vice president; P. H. Oberholtzer, secretary; and V. I. McCarthy Sr., treasurer.

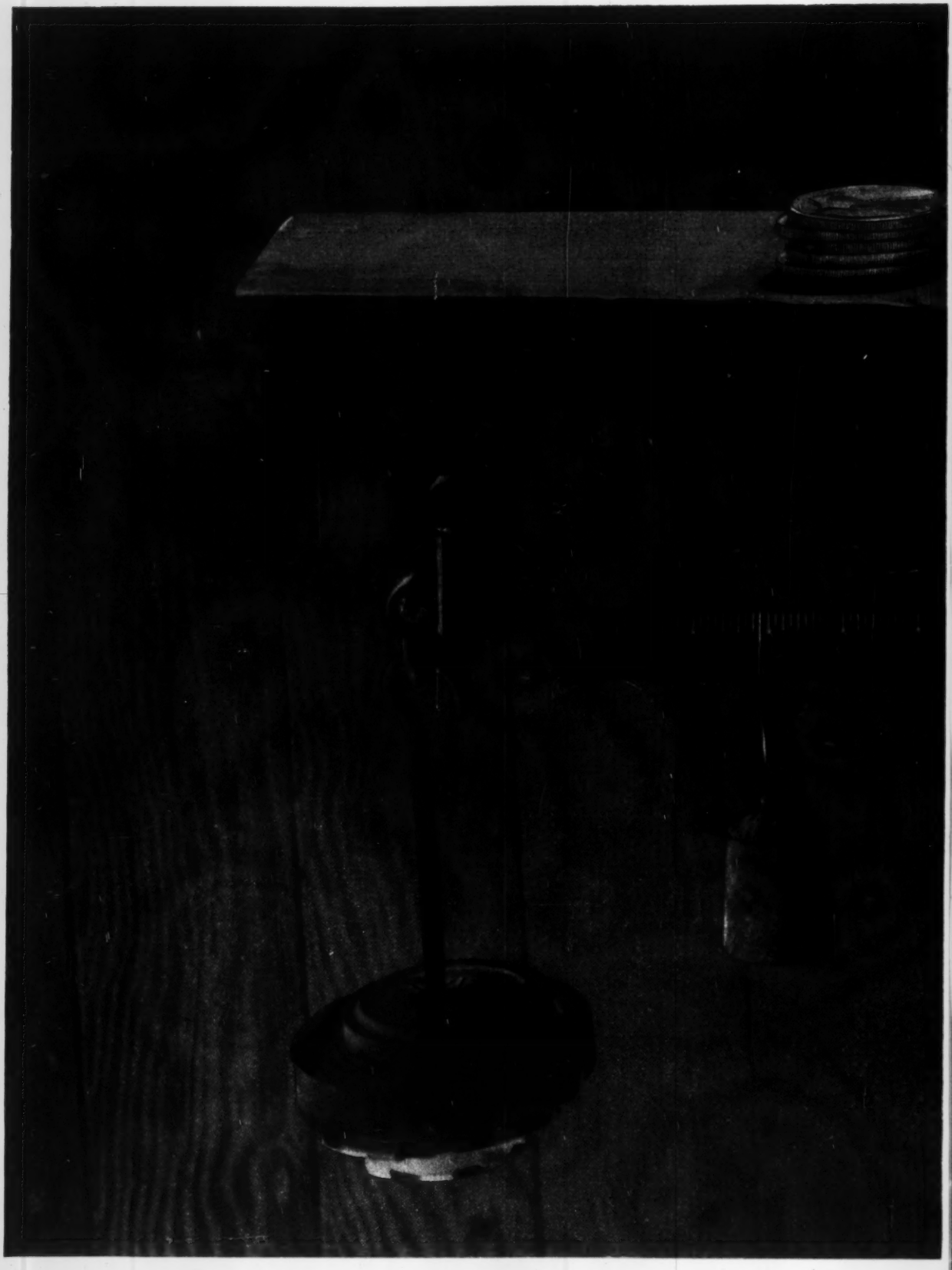
Hoover Plans R&D Facility

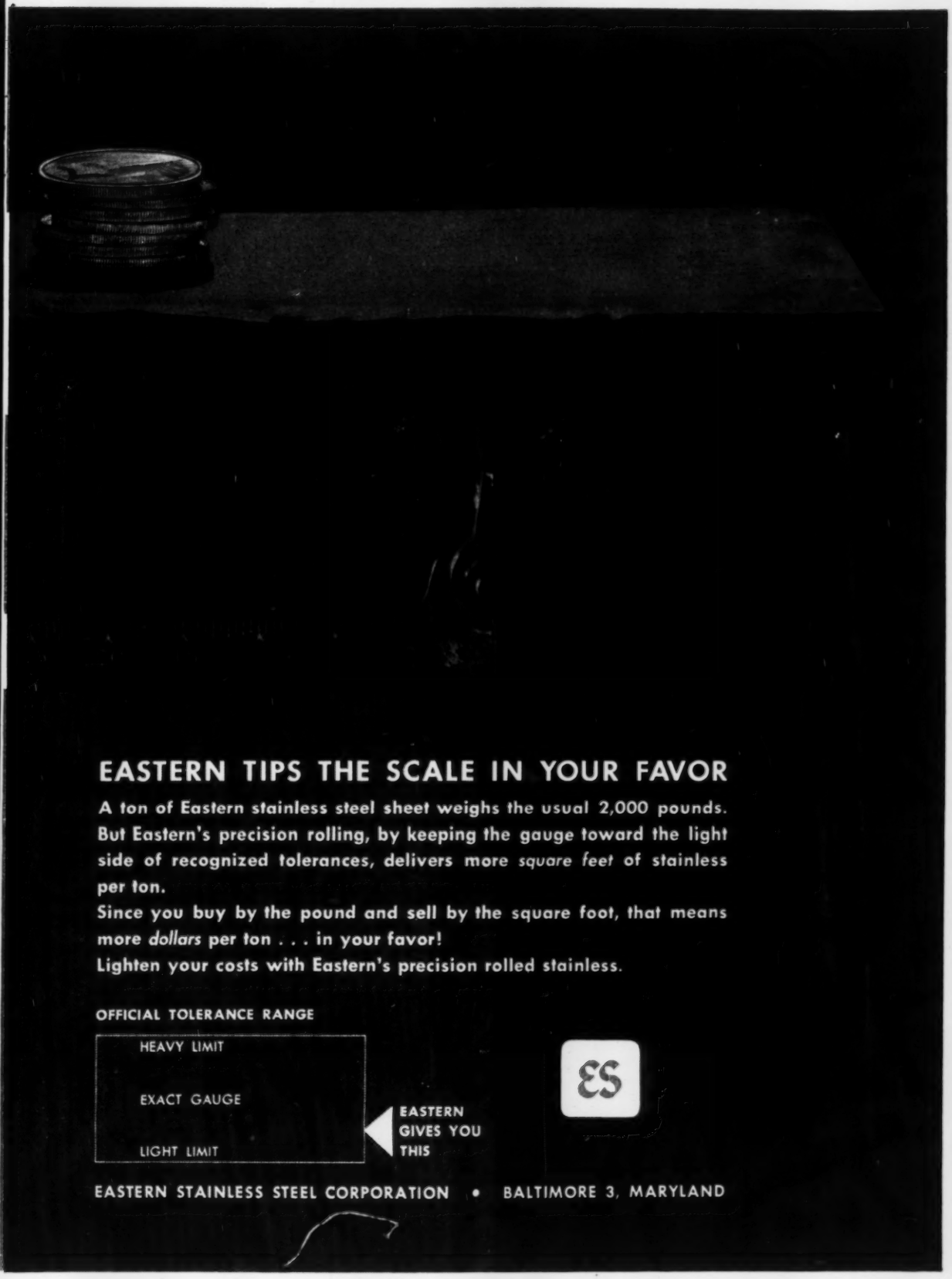
Hoover Ball & Bearing Co., Ann Arbor, Mich., is constructing a research and development building in Saline, Mich., adjacent to its machine tool subsidiary, Uniloy Inc. The new 27,000 sq ft facility will house a controlled atmosphere electronics laboratory. H. L. Schrock Jr. is president.

Will Build Line in Canada

Under an agreement between E. W. Bliss Co. of Canada Ltd., Toronto, Ont., and John Bertram & Sons Ltd., Dundas, Ont., the full line of Bliss metalworking machinery will be manufactured in Canada. Equipment specified in the agreement includes Bliss presses, rolling mills and auxiliary equip-

(*Please turn to Page* 90)

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Lighten your costs with Eastern's precision rolled stainless.
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(*Concluded from Page 87*)

ment; and Mackintosh-Hemphill pipe, tube, and rod straightening machinery, roll turning lathes, and related equipment. Previously, sales by the subsidiary of E. W. Bliss Co., Canton, have been primarily press-room equipment built by the parent firm in the U. S. and its subsidiaries in Europe.

Consolidated Renames Unit

Consolidated Vacuum Corp., Rochester, N. Y., a subsidiary, is the new designation of the former Rochester Div. of Consolidated Electrodynamics Corp., Pasadena, Calif. The subsidiary produces high vacuum equipment and environmental test apparatus.

ASSOCIATIONS

Non-Ferrous Founders' Society, Evanston, Ill., elected these officers: President, M. E. Nevins, Wisconsin Centrifugal Foundry Inc., Waukesha, Wis.; first vice president, E. G. Brumund Jr., Brumund Foundry Co., Chicago; and second vice president, D. A. Mitchell, Progressive Brass Mfg. Co., Tulsa, Okla. Herbert F. Scobie, executive secretary, continues as secretary-treasurer; Miss Florence M. Guernier, assistant secretary-treasurer.

Cast Bronze Bearing Institute, a product group of the Non-Ferrous Founders' Society, Evanston, Ill., elected these officers: President, W. H. Crossman, Randall Graphite Bearings Inc., Lima, Ohio; vice president, C. N. Paden Jr., Moccasin Bushing Co., Chattanooga, Tenn.; and secretary-treasurer, A. G. Eberle, Renewal Service Inc., Philadelphia.

Elden L. Auker, Bay State Abrasive Products Co., Westboro, Mass., was re-elected board chairman of the **Grinding Wheel Institute,** Cleveland.

Conveyor Equipment Manufacturers Association, Washington, elected these officers: President, O. A. Johnson, Gifford-Wood Co., Hudson, N. Y.; vice president, E. H. Woodberry, Lamson Corp., Syracuse, N. Y.; treasurer, H. A.

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The revolutionary P-K W-POINT Socket Set Screw is not only new—completely new—it is capable of delivering the highest degree of holding power ever attained... at no increase in price!

What's the difference between the new P-K W-Point and ordinary cup point set screws? It's the new pivot point that's built into the cup! This exclusive P-K feature reduces "wobble" caused by the required tolerance clearances between screw threads and the tapped hole . . . minimizes "tipping" motion imparted by key tightening . . . creates tracking which is uniformly even in depth and shape . . . results in frictional engagement of both cup edge flanks . . . provides:

30% more back-out torque

50% more resistance to vibration

50% more resistance to rotary slippage

Test this new socket set screw in your own plant. Ask your P-K Industrial Distributor for complete information and samples today, or write to P-K direct for technical bulletin No. 1106.

PARKER-KALON® W-POINT Socket Set Screw

PATENT PENDING

PARKER-KALON, *a division of General American Transportation Corporation. Clifton, New Jersey. Offices and Warehouses in Chicago, Los Angeles.*

Barber, Barber-Greene Co., Aurora, Ill.; and secretary, G. H. Woodland, Chain Belt Co., Milwaukee.

Paul W. Christensen Jr., Cincinnati Gear Co., Cincinnati, was elected president of **National Metal Trades Association,** Chicago. Bert M. Walter, Clark Equipment Co., Buchanan, Mich., was named treasurer and G. M. Stickell, Landis Machine Co., Waynesboro, Pa., was re-elected vice president.

CONSOLIDATIONS

Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, and **Hammond Iron Works,** Warren, Pa., have merged. Pittsburgh-Des Moines also will acquire Hammond's foreign affiliate, Hammond Latino Americana SA. Officers of the combined company, Pittsburgh-Des Moines Steel Co., are: Chairman, J. E. Jackson; president, W. R. Jackson; vice presidents, R. Y. Kopf, T. W. Fauntleroy, C. A. Fegtly, and R. E. Kramer; secretary-treasurer, T. G. Morris; and assistant secretary, M. P. Cook.

Merger of **Dixie Fire Brick Co. Inc.,** Birmingham, with **A. P. Green Fire Brick Co.,** Mexico, Mo., has been completed. Dixie manufactures fire brick and refractory materials at a plant at Kimberly, Ala.

American Meter Co. Inc., Philadelphia, acquired **Granberg Corp.,** Oakland, Calif., manufacturer of meters and pumps for oil tank trucks, bulk plants, and pipelines.

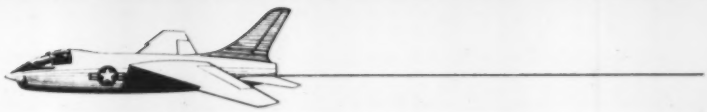
L-R Heat Treating Co., Newark, N. J., and **Ace Metal Treating Corp.,** Elizabeth, N. J., have merged. The new company, L-R Metal Treating Corp., operates metal treating and metal finishing facilities. Officers are: President, F. J. Rizzo; executive vice president, Herbert Dobkin; treasurer, Ben Belnick; secretary and sales manager, D. I. Dobkin; and general counsel and assistant to the president, Paul Vanadia.

Clark Equipment International CA and its affiliated German licensee, **Ruhr Intrans Hubstapler**

(*Please turn to Page* 96)

Forging Eliminates PROFILE Machining

18 inch aluminum impeller



This big 18" aluminum* impeller was originally *machined* from a rough forging...requiring many costly man-hours. Then Arcturus, utilizing techniques they have pioneered, developed a method for *forging* the vanes to the finished state shown above . . . saving considerably on material, eliminating all profile machining and reducing the cost of the finished part substantially. Grain flow follows the contour of the part, providing greatest possible strength.

This was no minor achievement as the impeller was an exceptionally difficult part to make by any known method. The vanes are approximately 3" high and less than 1/16" thick, yet extremely close tolerances were held.

Very likely, that machined part you are designing could be *forged* by Arcturus far more efficiently. We work in most metals and high temperature alloys. Send us your drawings and specifications today for further information.

** Can also be forged from many high-strength alloys.*

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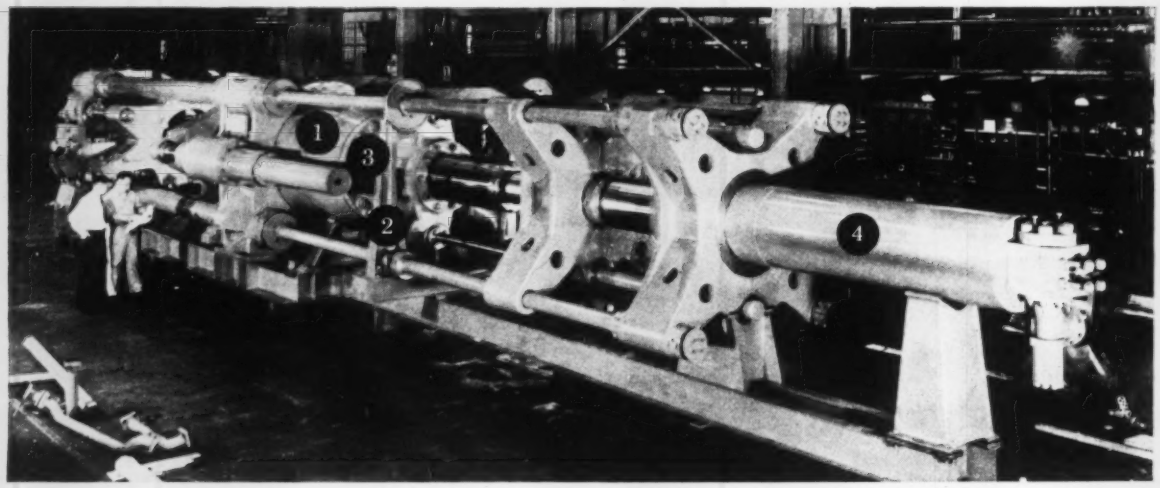
The precise reasons why Loewy extrusion presses offer the maximum in production, economy, endurance, flexibility



3000-ton-capacity water-hydraulic extrusion press with independent external piercing device

1. Inserted forged steel main cylinder
2. Simultaneous setting of stop nuts by chain attachment mandrel arresting device
3. Prefill valve connector of patented design
4. Inserted forged steel piercer cylinder

Many of the outstanding features of Loewy extrusion presses are a result of anticipating the needs of our customers. Others, of course, stem from special designs made to satisfy the requirements of a specific client. The principle of changing basic designs to meet individual requests has resulted in presses that offer maximum production, economy, endurance and flexibility.

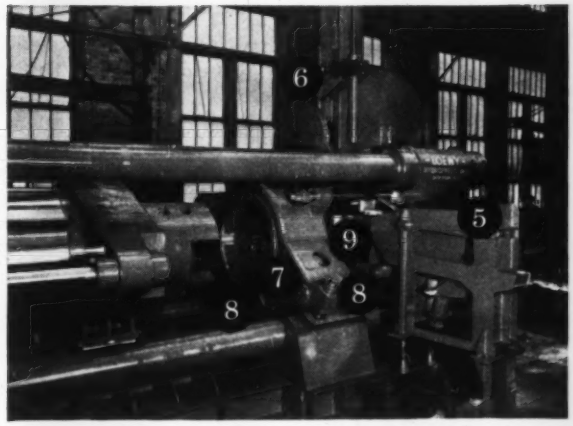
Loewy presses can handle all extrudible metals and alloys. They allow a combination of the variable operating conditions of pressure, speed, temperature and billet size needed for a perfect product. They are, moreover, built for the utmost economy of man-hours, cycle time, horsepower, maintenance and floor space.

In our designs, pushbutton automatic control has been developed to the highest degree of functional perfection.

Extrusion speed adjustment, billet, dummy and cleanout disc handling, die change and rotation—all can be fully mechanized.

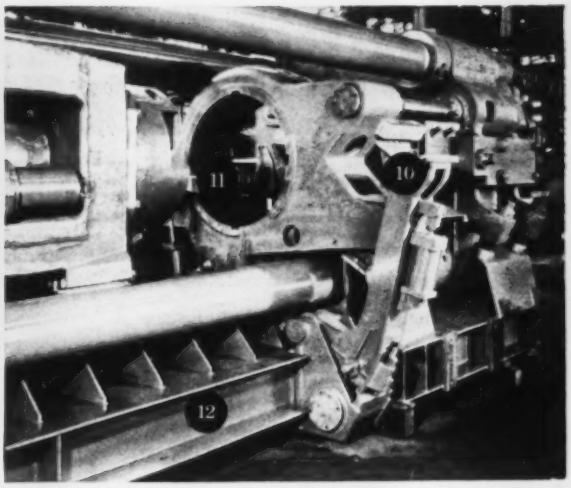
Rigid welded steel construction insures utmost precision in alignment and, where tubular products are concerned, highest concentricity. One-piece design of larger components prevents warping at high operating temperatures. Auxiliary movements are provided with independent pressure supply.

The pictorial story presented here sets forth some of the features of Loewy extrusion presses, all of which are the product of many years' study, research and development. And many other important advances are currently in the making. For detailed information, write Dept. B-11.



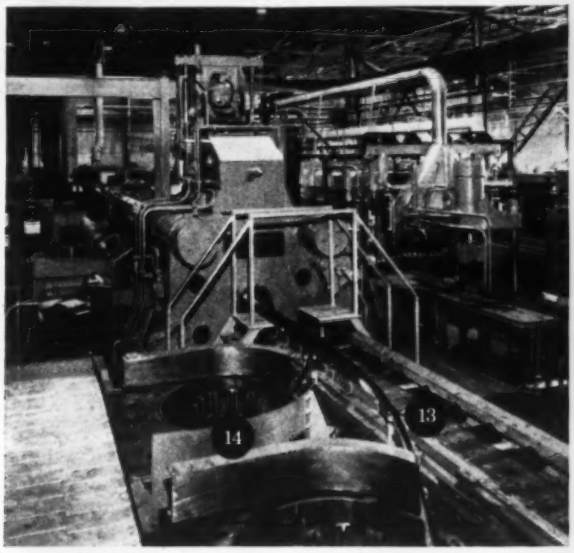
3000-ton-capacity self-contained oil-hydraulic extrusion press

5. Mechanized die-changing device permitting use of several dies in rotation without manual die changing and without interruption in main press cycle
6. Vertical sliding butt saw with oil-hydraulic feed control
7. Movable container holder of one-piece design that will not warp under influence of heat
8. Adjustment that insures concentric alignment
9. Lateral die slide, hydraulically operated, with two stations for die assembly and for removal of butt and shell



3000-ton-capacity water-hydraulic extrusion press with internal piercing device

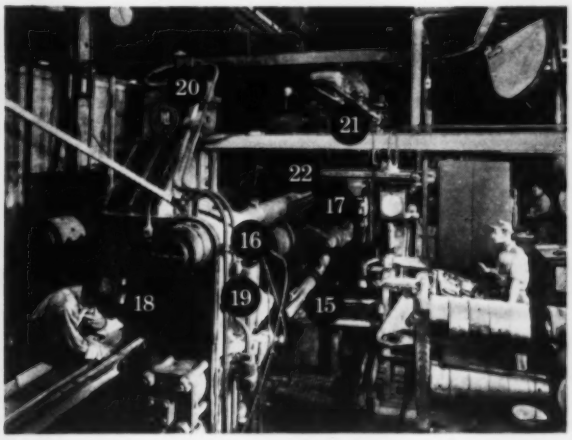
10. Billet loader of robust pivot-arm design
11. Cleanout disc loading device mounted in front of container
12. Base frame—one-piece design of rigid welded construction that facilitates alignment of press assembly



3000-ton-capacity water-hydraulic extrusion press

13. Mechanization of run-out side of press for straight solid and tubular extrusion

14. Double coiler designed for the wire rod to be received near the outlet of the press



2200-ton self-contained oil-hydraulic extrusion press

15. Simple, easily adjustable billet loading device
16. Container holder designed to permit fast change of container, which can be removed on return press stroke
17. Ram speed indicator
18. Large platen hole for ease of access to emerging extrusions
19. Heavy-walled pipes rigidly supported to cut vibrations, leaks
20. Powerful, rigidly constructed shear
21. Large oil reservoir for minimum operating temperature
22. Full-size catwalk for ease of maintenance

Loewy-Hydropress Division

BALDWIN · LIMA · HAMILTON

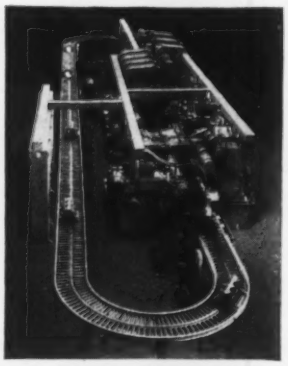
111 FIFTH AVENUE, NEW YORK 3, N.Y. Rolling mills • Hydraulic machinery • Industrial engineering

STEEL from Wheelock, Lovejoy BULLETIN

W-L DETROIT For the first time, HY-TEN D-2 air hardening steel now available here in rounds, squares, flats and billets. Also a fine stock of standard alloy grades, especially A-8620, as well as all HY-TEN grades. Excellent service from our new warehouse.

W-L CHICAGO Steady demand for "B" No. 3X for flame-hardened parts such as boring bars. Good stocks of HY-TEN AIS the best carburizing alloy steel, and freest machining available today—a new W-L exclusive!

W-L CINCINNATI This 23-station Avey Line-O-Dex transfer machine, designed and built by The Avey Division of Motch & Merryweather Machinery Co., Cincinnati, Ohio, is equipped with spindles made of our HY-TEN "B" No. 2. This grade was chosen for its great tensile strength (100,000 P. S. I. in the natural condition), toughness, and fine wearing qualities.



W-L CAMBRIDGE We are now distributing FLEXANGLE, the easy-to-erect structure assembly for all types of racks, shelves, platforms, etc. It's completely universal and low in cost — can be used anywhere, by anyone, for any storage purpose.

W-L HILLSIDE Our stock of flat and square sizes in HY-TEN M Temper Oil Hardening Steel can save you time and money in your tooling program. HY-TEN "B" No. 3X pre-heat treated in rounds, squares and flats available in a wide range of sizes. Billets on hand for hammer forging in all grades of HY-TEN.

W-L CLEVELAND Excellent stock of brake die flats and squares. Also many sizes up to 16" x 18" in HY-TEN Mold Steel. Excellent deliveries.

W-L BUFFALO A wide range of rounds and hexagons in cold drawn AISI leaded and non-leaded A-4140. Also many sizes of the new "B" No. 3X-40 in rounds and hexagons.

Write our Cambridge office today for your *free* Wheelock, Lovejoy Data Sheets. They'll give you complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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AMERICAN STEEL WAREHOUSE ASS'N

AGENTS: Southern Engineering Company, Charlotte, N. C.; Sanderson-Newbould, Ltd., Montreal & Toronto

(*Concluded from Page 93*)

GmbH, have acquired the assets of **W. & J. Scheid,** Limburg/Lahn, West Germany, manufacturer of road rollers, compactors, vibrators, and other road repair equipment. Clark Equipment International is a subsidiary of Clark Equipment Co., Buchanan, Mich. The reorganized German firm, Scheid Maschinenfabrik GmbH, is installing additional equipment and will expand its line to include Clark's line of Michigan construction equipment. Its plant has 170,000 sq ft of manufacturing space and includes a steel and iron foundry.

Great Lakes Carbon Corp., New York, is acquiring **Crescent Carbon Corp.,** Rosamond, Calif., a subsidiary of Crescent Petroleum Corp., Tulsa, Okla. Great Lakes Carbon will make the plant and assets of Crescent Carbon a part of its Electrode Div.

Rheem Mfg. Co., New York, acquired a majority interest in **Califone Corp.,** Los Angeles. Califone will be renamed Rheem Califone Corp. by Dec. 1 and will be operated as a Rheem subsidiary to make record players, sound systems, language laboratories, and related teaching equipment.

Telecomputing Corp., Los Angeles, purchased **Monrovia Aviation Corp.,** a subsidiary of Carrier Corp., Syracuse, N. Y. The Monrovia, Calif., firm makes aircraft subassemblies and ground support equipment.

NEW PLANTS

Weston Hydraulics Ltd., subsidiary of Borg-Warner Corp., Chicago, opened its 100,000 sq ft plant at Van Nuys, Calif. The firm makes aircraft and missile components.

Teleflex Industrial Products Inc. is operating on a full scale basis at its plant in Boyertown, Pa., making mechanical remote control systems. Officers of the new company are: President, M. C. C. Chisholm Jr.; executive vice president, C. W. Peacock; and secretary-treasurer, A. J. T. Sturrock.

when you've got a technical product, sell it!

Your product represents an investment in technical know-how, aimed at solving your customer's problem. Too often this is overlooked. Price and availability are depended upon to make the sale.

By the time your sales force arrives at the scene, several decisions have already been made by the technical man *who cares what happens to metals.* This problem-solver, whom we call the "metals engineer," plays a critical part, regardless of title, wherever metals are produced, fabricated, tested and applied.

One publication speaks directly to 30,000 metals engineers – Metal Progress, the monthly magazine devoted to the engineering of metals. Here is the way to reach a vital market. Specify Metal Progress to complete your advertising program for 1960.

Metal Progress

Published by The American Society for Metals

when in Cleveland, visit our new headquarters . . .

METALS ENGINEERS AT WORK
L/R: Dr. Ralph Leiter, Director of Laboratories, and Charles B. Allen, Chief Metallurgist (Red Lion Plant)
—The Budd Company

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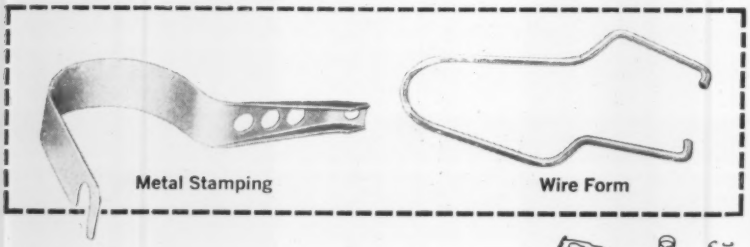
4 reasons why

Nilson Automatic 4-Slides are "Universal" Forming Machines

1. **Form Wire or Ribbon Metal Stock**
2. **Accommodate Long or Short Pieces**
3. **Job Versatility through Quick-Change Cams**
4. **Combine Stamping & Forming in 1 Machine**



Every Nilson Automatic 4-Slide is truly a "universal" forming machine, a machine designed to produce either wire forms or metal stampings at high production rates.

Open construction provides easy access to all tooling . . . permits rapid changeover from one stock to the other. And longer feeds, longer slide strokes give a Nilson the built-in ability to handle a wide range of work sizes — without special attachments or accessories.

For real efficiency in your pressroom, just pick the capacity you need from Nilson's 17 models of 4-slides! One of these versatile machines will make your stamping and forming operations faster, easier . . . and more profitable.

SIZE RANGES:
Wire up to ½" diameter
Ribbon stock to 3½" wide
Feeds up to 32"
5 TO 75 TON
PRESS SECTIONS

Write today for the Nilson General Catalog on Automatic 4-Slide Equipment

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AUTOMATIC WIRE & RIBBON METAL FORMING 4-SLIDE MACHINES • WIRE & STOCK REELS • WIRE STRAIGHTENING EQUIPMENT • AUTOMATIC STAPLE FORMING MACHINES • SPECIAL WIRE FORMING EQUIPMENT

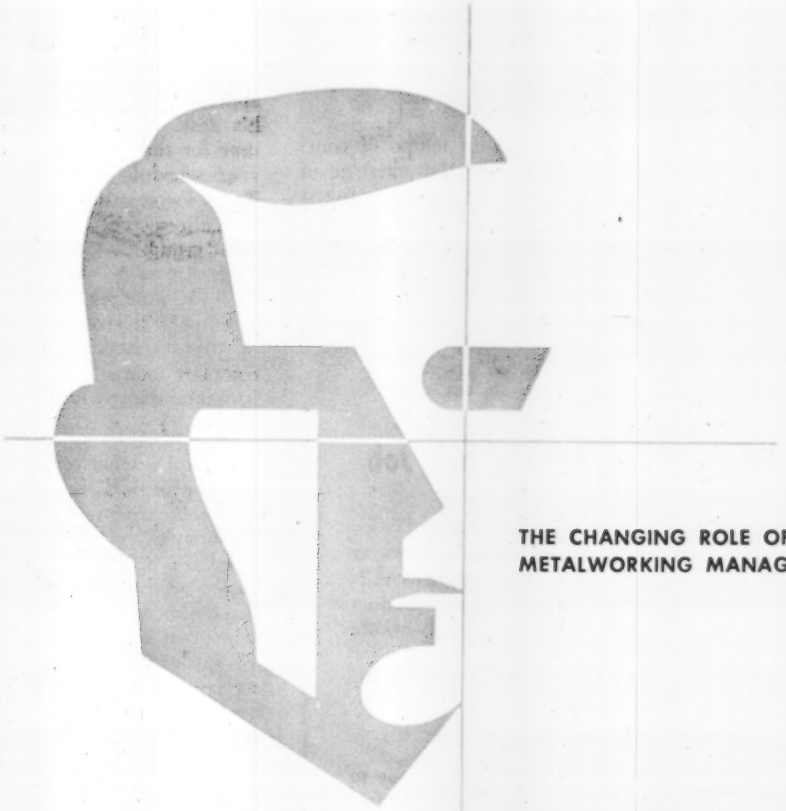
Program for Management In 1960

The article beginning on the opposite page concludes our Program for Management—1959. STEEL's 1960 series will be introduced in the annual issue, Jan. 4.

The 1959 articles are:

1. **Profile of Metalworking's Managers (Feb. 16, p. 137).**
2. **Improving Productivity (Mar. 16, p. 103).**
3. **Keeping Wages in Line (Apr. 13, p. 95).**
4. **Giving More Public Service (May 18, p. 99).**
5. **Meeting Foreign Competition (June 15, p. 131).**
6. **Keeping Pace with Technology (July 13, p. 95).**
7. **Increasing Research, Development (Aug. 17, p. 87).**
8. **Improving Marketing (Sept. 14, p. 153).**
9. **Management in Transition (Oct. 12, p. 101).**
10. **The Manager of the Future (Nov. 16, p. 99).**

An extra copy of these Program for Management articles is available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



THE CHANGING ROLE OF METALWORKING MANAGERS

The Manager of the Future

"SO you want to know how much management has progressed in the last ten years . . . from 1960 to 1970," said Jim Marvin, the president of Midwest Metalworking, repeating the opening question of the STEEL reporter who sat across the desk from him. He paused thoughtfully before he spoke again.

"I hardly know where to start, but let me put it this way. I've been president here a little over ten years now." He stopped to pull the wrapper from a cigar.

"We've doubled our sales. Kept our plant as up to date as possible. And we've made some shifts in our management techniques."

He took a couple of deep draws on the cigar, which lighted automatically.

"As I said, we've changed our approach to management a bit. But nothing revolutionary—in fact, it has evolved quite smoothly."

The reporter interrupted: "Mr. Marvin, will you spell out that evolution in terms of the people and functions involved?"

"Certainly.

- "First, we have fewer lower and middle managers than we did in 1960, but they're head and shoulders above their predecessors. Their jobs are far more challenging . . . and rewarding.

- "But we have more top level managers. The organizational pyramid has flattened out. Compare the roster of our executive committee,

which'll meet in 10 minutes, with that of ten years ago. We didn't even know a psychologist, let alone have one for a corporate executive. Jack McKee, our methods vice president, was way down the ladder in the engineering department.

• "Data processing started in the accounting department, spread to order processing and billing, and now it practically controls our whole operating system.

• "And what a boon the central data and information file turned out to be! Gone are most of the expensive and voluminous individual and department records everybody used to keep. The only duplication now is the microfilm of key records kept at the bank.

• "The stepped-up tempo of competition is another characteristic of the times. Managers have to ingest and digest more information and detail than ever before. Decisions require more innovation, meaning that creativity is at a premium on the top management level."

This time Jim Marvin was interrupted by his secretary, whose face appeared on the video monitor on his desk. She reminded him: "It's time for the executive meeting, and your schedule is pretty full today. Don't forget you meet at 4 o'clock with the district industrial development group."

He turned to the STEEL reporter, "Bill, I want you to sit in on this meeting. It'll give you a better idea of the mechanics of managing a company today. Then we can come back and discuss it."

Pressures Promising Changes in Your Job

Continued Growth

Population will increase to 215 million by 1970. Gross national product will top $700 billion. Metalworking sales will climb to $300 billion.

Information Explosion

Operating a business will continue to get more complex. Technological change will accelerate as Western Europe and Russia continue to step up their research and development. To keep pace, you and your company must keep abreast of the ever-increasing flood of new information.

Tougher Competition

Companies will continue to get bigger. There'll be more of them. More foreign-made products will invade domestic markets. If you're to continue to grow, you'll have to sell more overseas. World-wide competition will be a fact of life.

Several executives were already seated at a dart-shaped table in the conference room. A picture of the company's computer (called the monster) was focused on a large screen on the wall.

The president explained Bill's mission at Midwest Metalworking as he made a quick check of attendance. The heads of finance, production, engineering, marketing, personnel, psychology, and aesthetics were there. "Where's Sorensen?" he asked. "Hope that skinny redhead isn't sick."

"No he isn't, Jim," responded Gil Martin, production director. "One of his boys in purchasing said he'd be in a couple of minutes late. He got a red flag on a supplier and is running a check on it."

"Well, let's turn on the monster and see what red flags we get," requested the president.

He explained:

"We have our computer programed pretty much along the 'management by exception' lines. We've got our objectives set, and each week we get a complete review of our activities—correct up to the moment the meeting starts. You'll notice the indicators appear when operations vary too far from the targets we've set. Jack McKee, our vice president-methods (he's the curly headed chap on the end) controls the information as it's being transmitted from the computer."

Function by function, numerical reports appeared on the screen.

"Financial looks good," commented the president. "Hold the produc-

Better Leadership to Meet the Pressures

The shift from private to widespread ownership of corporations has had a major impact on the manager's job, points out Henry Spitzhoff of Robert Heller & Associates Inc.

The trend is accelerating. It has brought about a basic philosophical change in the way we operate our businesses:

- **An objective decision is often difficult for a top manager when he has to look over his shoulder at stockholders and upcoming dividend payments.**
- **He can no longer "gamble" company money on a new venture in the manner of the traditional entrepreneur.**
- **Employee relations continue to evolve—no longer can the manager achieve top performance with a "do it or else" dictate.**

The change places a priority on the manager being better informed. He'll be unable to rely on the hunch or arbitrary decision as freely as today. His actions must be based on facts.

An organization format will be required to provide the manager all the facts on which to base decisions as quickly as possible. Management will have to know the tools required and how to get individual managers to use them effectively and economically.

It can only be accomplished through better leadership.

HENRY SPITZHOFF

tion report a moment. Gil, what are those ripples in the month-ahead projections?"

"Nothing too serious, chief. Some quality and delivery problems from one of the suppliers have shown up in the daily tapes. They have held up the optimum schedule and boosted scrap costs some — Sorensen's checking on that now.

"And there are two other factors. We'll install the new multiple feeder device on line 4B Friday. One of the boys developed the problem situation and ran a tape on it. It indicated that if sales of the Tarter component remain level, we'll have adequate warehouse stocks to meet deliveries. Essentially, it indicated that it'll be cheaper to install on Friday and save the overtime. We can make up warehouse stocks when the line starts up again."

The president nodded. "What's the other factor?" he inquired.

"The weather," said Gil. "The latest government report indicates a heavy snowstorm next week. We pumped this into the monster and it predicts 20 per cent of the work force won't make it into the plant that day, nor possibly the next. The machine has already worked out the necessary personnel shifts and machine loading to achieve the optimum production line balancing. Sure beats the good old days of having a dozen staffers wrestle first with time cards to find out who was in and who wasn't, and then with skill classifications to get the men placed so some semblance of production could be attempted."

As the production manager was finishing, the door opened, and a redhead entered.

"Good morning, Sorensen," the president greeted the manager of purchasing. "Gil was just telling us of your supplier problem—anything urgent?"

"I don't think so, Jim. The Cutter Co. was getting a little behind, and some of their stuff turned out to be rejects. Naturally, the control tape caught it, and the computer shot up the flag—even suggested that we change suppliers. You know the input factors—price, quality, transportation, quantity discounts, delivery reliability, engineering service.

"Trouble is, our optimum purchasing machine has no heart. We checked with Cutter. They are having some production line troubles and said they'd have them licked by next week—they're debugging some new equipment. I know there's another firm trying to get to us with price, but the machine turned them

Mass production and automation techniques have upgraded the plantworker and taken the drudgery and monotony from his job. Data processing equipment has done the same for the clerk and officeworker. Now equipment is being developed to upgrade the junior and middle manager, to boost his productivity.

The 'Thinking' Machine . . . Is It on the Way?

1960s

Human judgment factors will be introduced.

The machine will be able to reprogram itself and solve ill-structured management problems.

1950s

Magnetic discs permit the storage of 10 million digits of information.

Magnetic tapes boost input speeds 50 to 75 times that of cards.

Medium and large scale computers can multiply a pair of 13 digit numbers in ½ millionth of a second.

1940s

Electronics is added to computers to speed calculations 1000 times faster than electromechanical system.

Internal memory devices to store programs and information on how to process input data replace card and tape "plug-in" systems.

1930s

Introduction of automatic multiplying speeds data processing and makes it more versatile. A pair of 8 digit numbers can be multiplied in 3 seconds.

Alphabetic accounting machine is introduced.

1920s

Concept of data processing began years ago.

Punch cards are perfected to carry 80 columns of information.

down the first time. We'll stick with Cutter for awhile."

The rest of the purchasing report chronicled on the screen indicated all standards and objectives were being met.

"Anything else, Sorensen?" asked the president.

"Well, if you've got a minute, I'll tell you a cute one we bumped into. We were running a problem on what sizes of strip we ought to buy for the new model electronic ceiling heater. You know, the problem that develops how many and what sizes of sheets to buy to get the best price and lowest scrap generation. There were three solutions—all identical costwise. We were about ready to pull one out of the hat when we thought of another factor —storage facilities. Sure enough, when we added that input, we came up with a one best approach."

"Good, let's flash in the sales activities," suggested the president. Turning to the reporter, he said: "This is Dick Brown, our marketing vice president.

"Dick," he continued, "what can you tell us about the sales? From the report, things seem well enough."

"We're doing all right, dollarwise," commented Brown. "The appliance and rocket components are hitting projections pretty closely. We did a better job predicting Magnowash's sales than they did. Industry's doing a better job of predicting total market potential than it used to—but they're making the same old human errors . . . being overoptimistic on how much they'll boost their share of the market each year. Actually, Trend Co. is gaining the most ground, and we're riding strong with them.

"But I want you gentlemen to take a look at the electronic ceiling heater sales. In South America, we're only slightly behind projections. Up here, we're ahead. But the thing that's bugging me is the distribution pattern. Please bring in those figures, McKee.

"There . . . South American sales patterns match the projections quite well. But look at the domestic pattern—only 20 per cent of the sales going to the 25 to 40 age group; a big 50 per cent to the 40 to 50 group; and 30 per cent to home owners and buyers over 50. Take a look at our projections—45 per cent

to the younger group, 35 per cent to the middle, and only 20 per cent to the 50 and older consumers."

"Does seem odd," injected Ed Donith, director of aesthetics, as he shifted his pipe. "Maybe we fell short on our customer preference studies.

"But I'm wondering first how our sales distribution matches the income level and geographic projections. Also, have we kept track of sales to new homes vs. old homes and correlated them with the age group patterns? The reason I ask is that it's going to be pretty expensive to make another analysis of the younger group's buying preferences."

The president directed a question to the methods vice president.

"McKee, got any suggestions for taping a revised program on the computer that'll refine our information a little more? Seems to me that some of the input factors you developed for the profitability of customer orders analysis might be helpful. Might even find that we don't want any more of this 25 to 40 age group market because of the extra costs involved in getting it."

McKee promised to "work something up this afternoon."

"Meantime," added the director of aesthetics, "I'll rehuddle with the psychologist on the preferences studies. Might be that with some minor alterations, we can come up with a new model—aimed specifically at this group—that could turn the sales curve upward. Maybe the model we turned down at the beginning might do the job. Engineering taped out the design feasibility and costs, and there was practically no cost differential between it and the one we settled on."

The president turned to the marketing vp: "You might run a check on competitors' sales and promotional activities to see how they jibe with the estimates we developed in our original gaming program."

The new manager of competitive intelligence was already on the job. "He has been out of school only a couple of years," explained the marketer, "but he's got a lot of computer knowhow. From his work so far, it looks like he has opened up some fresh information pipelines too. He should have a comparison ready for us by tomorrow afternoon or Wednesday morning."

The monster was finally shut off, but the president said he had another item to discuss. "It deals primarily with the middle managers—but it's basically your responsibility.

"Frankly, I think there's too much reliance being placed on the system—the computer and our entire data processing program. True, we've got a pretty sophisticated setup—the monster waves red flags when inventories get below or above set limits so we can change production schedules. And then it tells us how to schedule that production and what materials we'll need where and when for the most profitable operations. It helps us do a lot of things. But it's basically a tool. We have to supply the judgment and creativity to get it to work effectively.

"Here are two simple illustrations. We're going to have to reduce production schedules on rocket component line H next week because one of our four suppliers went out on strike this morning. Now the computer can figure out the economic ordering quantities and optimum inventory levels, but it can't predict a strike. Certainly, somebody should have known those negotiations were coming up and at least investigated the possibility of a strike. I'm sure that an inventory cushion could have been provided had someone been alert to external factors.

"The other situation was in Plant No. 3 where we've been running some specials for Magnowash. Admittedly, an error was made by central scheduling—they scheduled 2506s for Wednesday, Thursday morning, and Friday. Somehow a batch of specials was carded for Thursday afternoon. Now the foreman could see that he'd have to shut down the line twice to change fixtures to meet the schedule and that logically the specials should go Friday afternoon. But did he challenge the schedulers? No. He passed the buck.

"Now I realize that 95 per cent of the time, the schedulers will be able to back up their programs with facts. But if department heads will be alert to the other 5 per cent and use a little judgment, we can patch up some cost leaks.

"O.K., gentlemen. I think that does it. McKee, I'd like you to join me and the STEEL reporter in my office."

Back in the office, the president took a water pitcher from a tray on his desk and carefully measured a glass of water. "Trick is to keep it from boiling over," he said as he offered the glass to the reporter. Then he dropped two small pills into it—one a coffee concentrate, the other a chemical that created a gentle boiling action. McKee, the vice president of methods, mixed his own.

"Here's a problem your readers are probably interested in," began the president, glancing at the reporter. "One of the toughest jobs a manager has is to keep up with the accelerating pace of technological change. McKee will confirm that, I'm sure."

"It is our toughest problem, chief."

The president nodded. "OYT university is ready to open its technological information center and has given us a chance to subscribe. It's pretty expensive, but I think that as our methods vp you should look into it, McKee.

"We've invested a substantial

The methods and situations described in this article are closer to fact than fiction.

STEEL created its hypothetical firm, Midwest Metalworking, after interviewing officials at International Business Machines Corp.'s Data Processing Div.

Some of the examples are based upon techniques already being practiced in varying degrees by a few firms. Some are based upon equipment and techniques being developed in IBM laboratories.

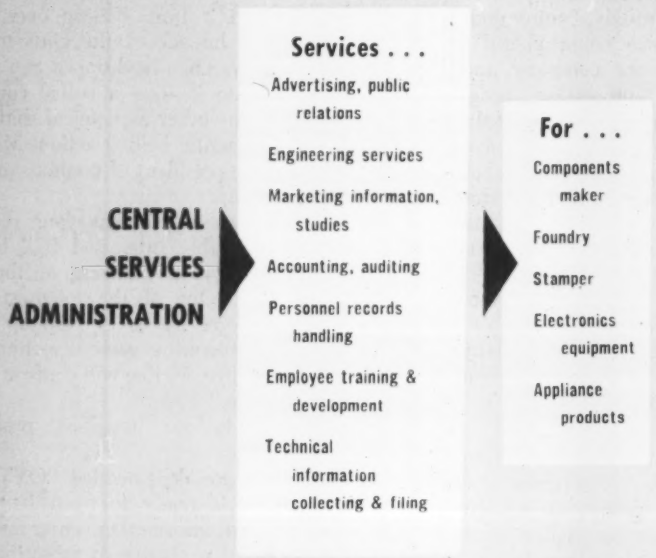
IBM officials are emphatic: Methodology — management's ability to use computers—is lagging behind computer technology.

And there lies your challenge!

For the small and medium size firms . . .

INDUSTRIAL SERVICE CENTERS

With increasing technology and specialization, the role of the small business will become more difficult. To compete successfully against their big competitors, they'll form central service organizations to share the expense of the costly equipment and staff required to perform the activities. It might look like this:



chunk of money in our own tech center, and by and large, I think it has done a fair job keeping pace with developments, particularly in the U. S. But the race is getting swifter all the time. Europe's research programs are turning out stuff as fast as we are now. Russia's doing equally well.

"OYT says it has refined its electronic abstracting equipment and has set up an elaborate worldwide technical collection system. The process will automatically abstract a technical paper, crossindex it, and put it into machine memory cores in seconds."

"How's the retrieval work?" asked McKee.

"Simple," the president pointed out. "The crossindexing is so selective that you can be as specific as you want. Pick the topic and scope of detail you desire. In seconds, the data processing equipment will give you the information on a reel of magnetic tape. We take the tape and run it through our electronic printer and out comes the abstract."

McKee thought it sounded good. "The research and development and the engineering boys should find it a good tool."

The president said purchasing and manufacturing could also benefit, adding: "I thought we could select some rather broad areas to take on a monthly basis for a watchdog activity. Then when someone requires more complete detail, he can request it."

McKee volunteered to check the system and make a report at the next committee meeting. "See you this afternoon on the expansion problem," he said as he left, prompting a smile and an observation from the reporter.

"I can see you've been too busy to step back and take a good look at how much management has changed in ten years."

"Right," observed the president, going off on another tangent. "One of our biggest challenges has been in getting and developing talented managers. I've got our personnel manager coming in shortly—I think the session will interest you."

He pressed a button, and a round face appeared on his video monitor. The president asked the face: "Got a minute, Walter?"

Walter materialized in toto shortly after his face faded from the monitor.

"You didn't get a chance to shake hands at the meeting," said the president. "Bill, this is Walter, our personnel manager." Then he got back to business.

"How's the management development program coming along? Are we going to be able to meet the needs for that new African assembly plant?"

"I think we're coming along O.K.," Walter replied. "Couple of the men were poking fun at the language courses. Wanted to know if we are developing them to be managers, or high priced linguists. I repeated your favorite comment: That you can buy anything in English, but to do an effective job of selling or managing, you have to do it in the language of the nationals."

President Marvin nodded. "Anything else?"

"Chief, I think we ought to take a new look at putting more men into the middle manager program. The manpower shortage STEEL magazine predicted, and has been harping on all these years, is proving to be on the low side. Competition for good managers is getting brutal.

"More and more foreign companies are competing for our men . . . not only for their activities over here but in other countries as well.

"The atomic energy industry is bidding for top talent at the same pitch as the aircraft and missile industry was ten years ago.

"The government is becoming a

bigger factor in the manager employment market since it started streamlining its activities. They're taking fewer people, but they're demanding the best . . ."

The president interrupted. "Walter, your trainee-hunting badge is showing again. I thought we threw it away. Unless the man meets the psychological, aptitude, and mental ability standards set up by the psychologist, he doesn't get into a program. Exposure to a program doesn't make a manager today any more than it did ten years ago—he has to have the potential.

"I hate to do it, but if you have to bid a little higher in colleges to get the good boys, do so. You also might check with our new manager of competitive intelligence. We'll see how much he knows about managers on the prowl."

"Will do," promised Walter. "Incidentally, I think you'll be pleased with a new progress report on the training and mechanization of design work in engineering. The men are taking to it readily, and the university mathematician has done wonders in helping to program the computer. The monster has already worked out some fairly complex designs—it certainly cuts down on the routine tasks engineers used to do manually."

Walter was being reminded to keep the president posted on recruiting activities when McKee reappeared.

"If you have no objection," interposed McKee, "I'd like to show you something while our friend from STEEL is here. Might be something he can use in his article.

"You know that I've been working with the university mathematician and our psychologist on making human judgmental inputs to the computer. It doesn't give the computer any real thought powers, but it does provide a process of selectivity based on the inputs. I'd like to work an experiment with you. Come over to the computer monitor.

"Now, we've developed what we feel are certain thought patterns that you, as president, have displayed in your day-to-day relationships with us. We've reduced them to a mathematical formula; they're in the computer.

"Here are six questions with mul-

Machines Will Help Educate Him

Just weeks ago, U. S. Industries Inc. disclosed a new educational machine which permits complete interaction with the student. The machine does not replace the teacher, officials emphasize. But it frees the teacher from duties of merely imparting information so that he may put emphasis on his basic teaching role of developing concepts, enlarging the horizons of the student, and motivating his learning.

USI's machine, the Tutor, is an automated "reader" which locates and presents any selected information—up to 10,000 items—in answer to a touch on the keyboard. Here's how it works:

1. **The information is presented to the student.**
2. **The machine then questions him to insure his learning of the information.**
3. **It corrects him if he answers wrong, expands on the material, and questions him again.**
4. **If the student answers correctly, the machine congratulates him and moves to the next area of material to be learned.**

Thus the machine develops the student's understanding step by step, at his own pace, making sure at each step that the student grasps the point presented. In addition, it records the progress of the trainee and provides a record of his approach and reasoning process.

tiple choice answers—as you can see, there are no right or wrong answers; it's primarily a matter of personal preference and judgment. You answer the questions on this card; and we'll feed the same questions into the computer."

The computer shot back the six answers by the time the president had circled his first. McKee waited.

"Here's what the computer says you'll do," McKee pointed out. "How does it compare with what you selected?"

"I don't believe it," said the president scanning the computer results. "The monster is right every time."

The reporter was also impressed. "Think what you could do to your competitors if you could program the thought patterns of their key men."

"Or they to us if they perfect the formulas first," shuddered the president. "Let's go to lunch."

Mr. Marvin went to the video monitor and pushed a button. "Anything else?" he asked his secretary.

"Yes. Thursday is your wife's birthday. Shall I make dinner reservations at the Lake Room?"

The reporter made a mental note: "Some things will never change."

A Certified Professional?

"Yes," suggests Lawrence Appley, president of the American Management Association. "Since management is professional, and since it calls for the use of scientific techniques, certification of qualified managers is implied.

"Many companies are already certifying their managers by passing upon their competency. It's extremely difficult," stresses Mr. Appley, "to certify how good a manager is. He may be outstanding today, mediocre tomorrow, and inadequate next year. But it is possible to certify that an individual has completed certain training and passed certain tests without which he could *not* be a good manager."

Here is a suggested list of qualities, knowledge, and skills to be measured:

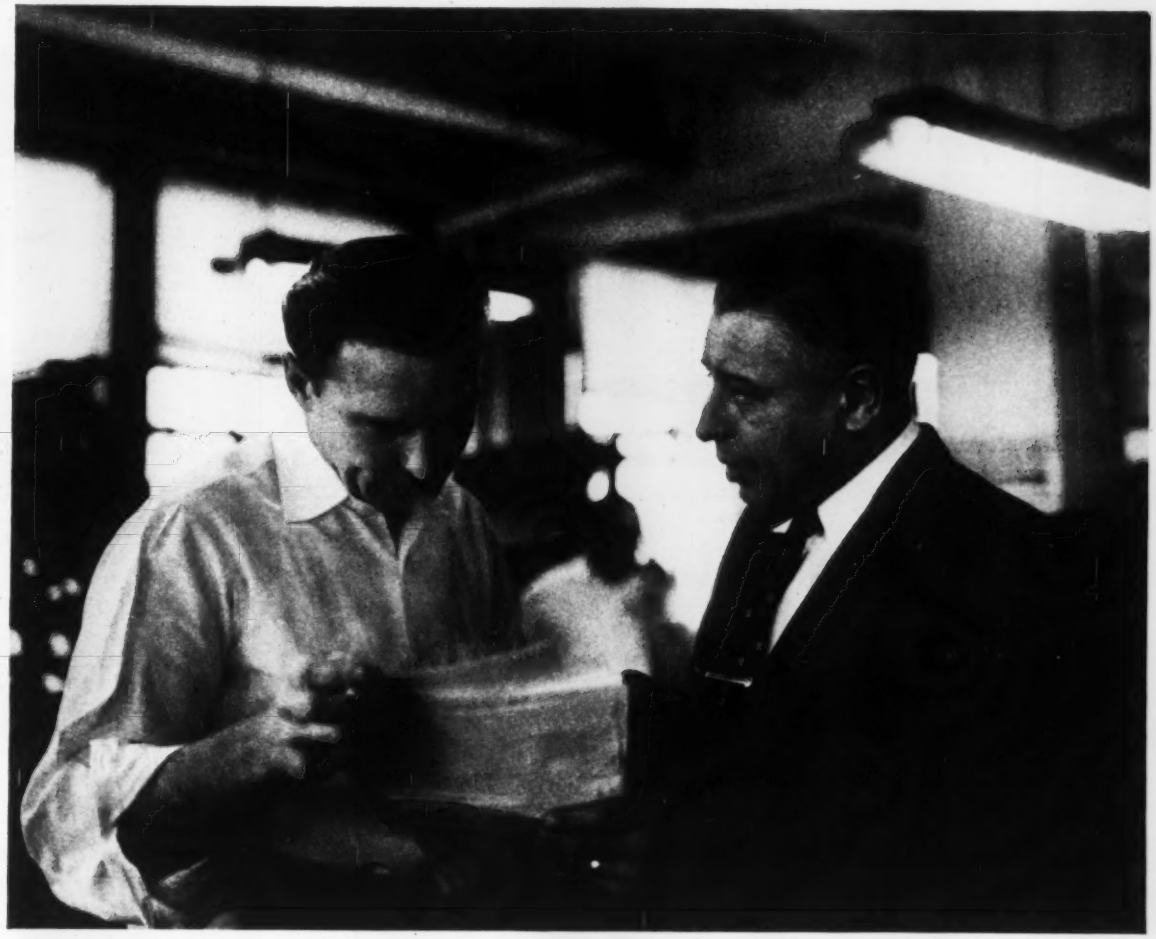
1. Emotional stability, psychological adjustment to the work to be done, basic management aptitudes. They should be ascertained by professionally recognized tests administered by experts.

2. Personal qualifications. In addition to such things as loyalty, integrity, intelligence, and job knowledge, these are important: Sensitivity to detail, awareness of opportunity, reliability, appreciation of human values, and economic acuity.

3. Philosophy and understanding of management.

4. Management skills. These can be ascertained by evidence of the exercise of them:

- **Long and short range planning.**
- **Organizing—including both organization structure and the people in it.**
- **Appraising—in terms of both standards of performance and specific measurements and controls.**
- **Decision making—involves determination of correct decision, alternative decision, timeliness of decision.**
- **Leadership—the powers of communication and inspiration for the motivation and development of others are important.**



"Yesterday this shop racked up a $423 loss!"

The foreman's bewildered. How can the Plant Manager be so sure? Even in a small shop like this one, you don't get *that* kind of information in 24 hours!

The Plant Manager never thought so, either. Today he knows different. He's got yesterday's down-time figures right in front of him. There's a loss all right. But he knows where – and why. And most important, he knows now that he's equipped to prevent its happening again.

How did the Plant Manager get such fast, reliable information? With Automatic Keysort Data Processing. Instead of the late or inadequate reports he *used* to get, Automatic Keysort now gives him an accurate breakdown of each day's labor costs *by the following afternoon.* Keeping abreast of things as they happen, he can correct money-losing situations *in time* . . . can keep production flowing on a profitable level.

Automatic Keysort's easy-to-use machines and punched cards require no specialized personnel, no restrictive procedures. Designed to fit your business as it stands and as it grows, Automatic Keysort will give you all the fast, accurate information you need for modern management control of every factory operation. And at remarkably low cost.

To learn more about how Automatic Keysort Data Processing can fulfill *your* need for timely, comprehensive facts and figures, call your nearby Royal McBee Data Processing Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, New York for brochure FS-33.

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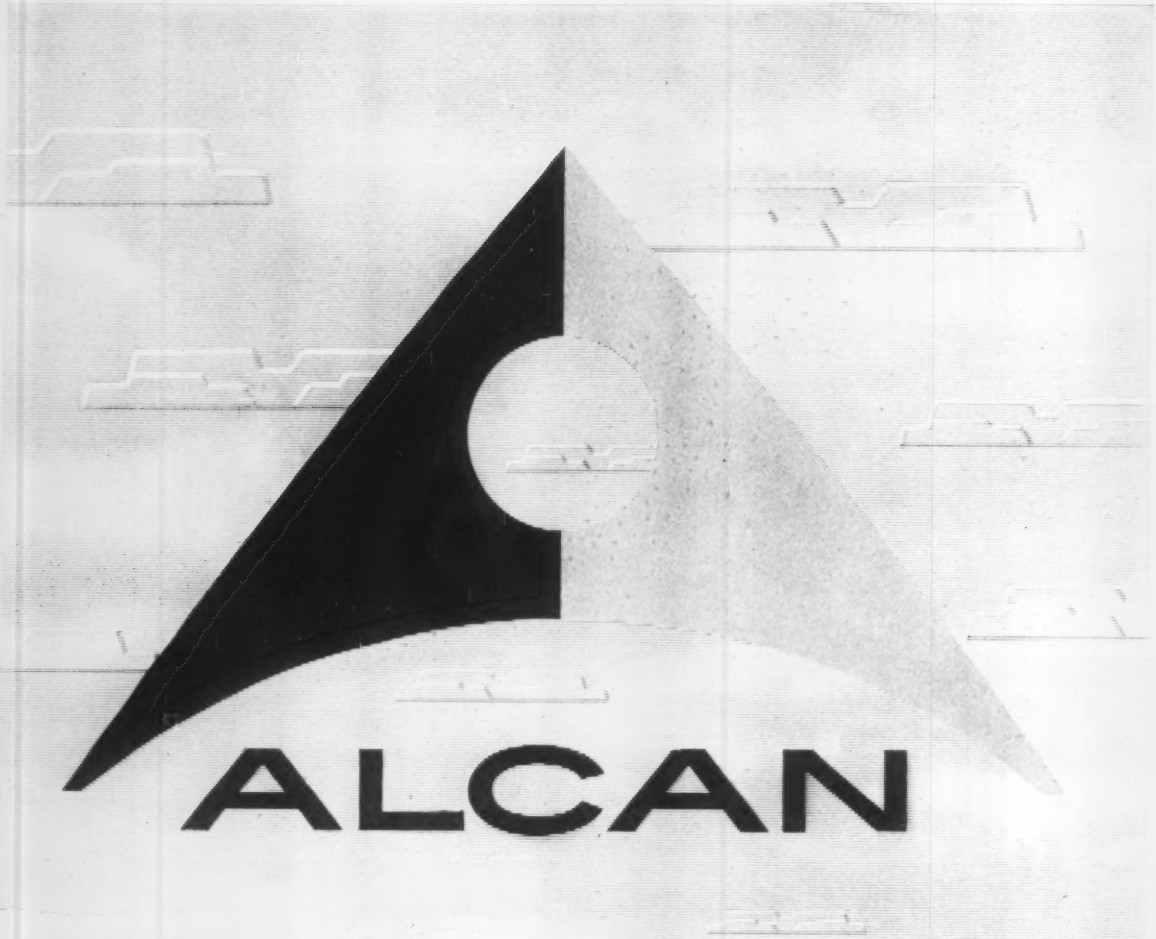
NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION



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ULTRAFAST METALWORKING—Ultrahigh velocity may bring on a completely new era in metalworking, believes Thomas E. Piper, technical director, manufacturing development, Convair Div., General Dynamics Corp., San Diego, Calif. Each material, he feels, may have an optimum working speed. He cites forging and extrusion tests sponsored by Convair which demonstrate that SAE 4130 steel extrudes best at 400 ft per second. It may follow that the same speed is also ideal for machining.

PALLET STANDARD BRINGS SAVINGS—Material handling authorities are hailing the new American standard (MH1.1-1959) which reduces pallet sizes from 300 to only 11. It makes mass production a lot easier and helps truckers and shippers plan their loading.

CONTINUOUS CASTING GAINS ABROAD—A 20 ton electric furnace will soon supply two continuous casting machines at an English plant, Barrow Steel Works Ltd. The British Iron & Steel Federation reports it is the first plant to depend on continuous casting for the bulk of its annual production (36,000 tons). Yield is said to be 98.5 per cent.

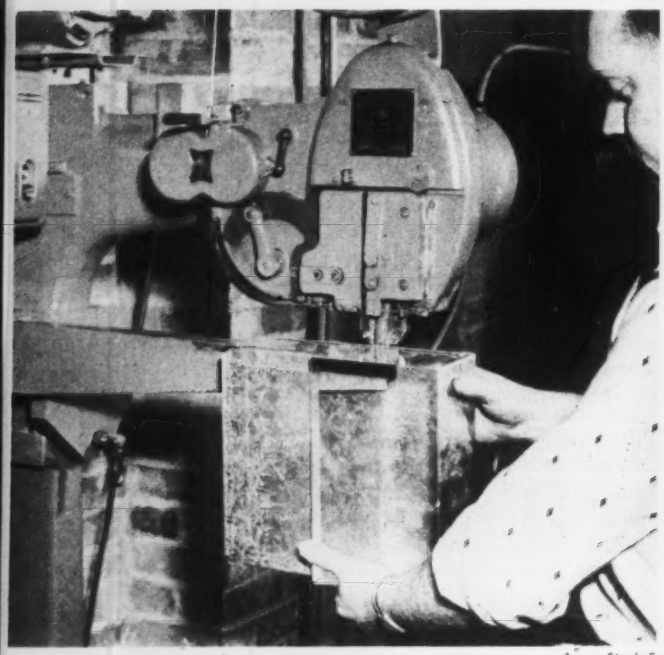
HOTTER TRANSISTORS—Rheem Mfg. Co.'s latest silicon mesatransistor is said to withstand temperatures of 400° F. It was developed to combat high temperatures encountered in many industrial applications.

FAST STRIP WELDER—A new, mash seam-welder joins a wide variety of strip widths and thicknesses for a high speed strip mill. The unit can operate at 30 second intervals making welds at 30 fpm, claims National Electric Welding Machine Co., Bay City, Mich.

CITES FOUNDRY NEEDS—Aircraft people like to deal with firms that employ a full time metallurgist, says Charles H. Avery, Norair Div., Northrop Corp., Hawthorne, Calif. Discussing 17-4 PH materials, he says: "Our major concern is finding foundries which consider investment casting a science rather than an art—ones that maintain adequate metallurgical knowhow and control." Example: Many castings for the T-38 Talon supersonic trainer require preheating of flask-type investment molds to 1300-1800° F, pouring of a chemically precise alloy, followed by furnace cooling.

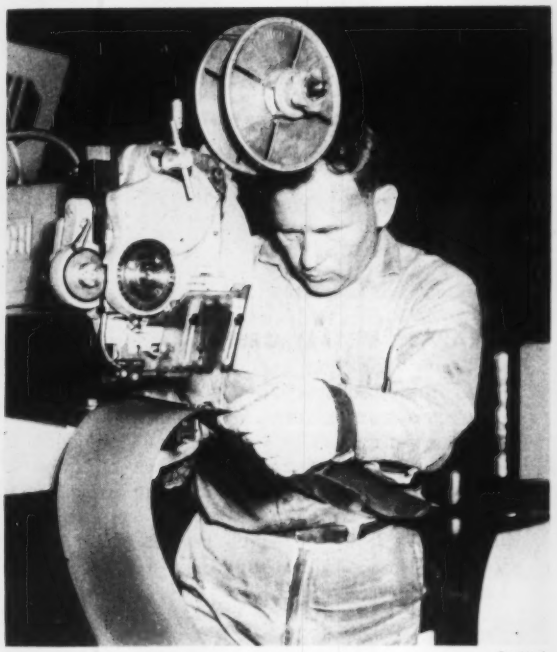
DUCTILE CHROMIUM IS NEAR—The extrusion of pure chromium metal into tubing marks a step toward finished parts of the high temperature resistant material, states Dr. James Wong, Nuclear Metals Inc., Concord, Mass. Union Carbide's laboratory grade chromium powder was cold compacted into a steel container and extruded hot over a mandrel.

BAR OF PRACTICALLY PURE CHROMIUM (99.99 per cent plus) held by Dr. John M. Blocher Jr., Battelle Memorial Institute, Columbus, Ohio, is expected to aid in the search for ways to improve fabrication properties and ingot yield of wrought alloys containing chromium. This crystalline bar, called Iochrome, may also lead to ductile chromium-based alloys



Acme Steel Co.

Chicago heating and sheet metal firm boosted production 700 per cent in fabricating air conditioning system parts by metal stitching. They used to be riveted



Bostitch

Metal stitcher fastens coils of brass strip for continuous annealing at Somers Brass Co., Waterbury, Conn. It used to be done by spotwelding

Metal Stitching Simplifies Fastening, Boosts Production as Much as 700%

MANUFACTURERS of such diverse lines as building products, appliances, and auto parts are realizing significant cost reductions by fastening metal with wire stitches.

The technique is being used in place of rivets, screws, bolts, spotwelds, clips, and cementing (in some instances).

City & Suburban Heating & Sheet Metal Co., Chicago, uses metal stitches to fasten sheet metal seams on register heads for heating and air conditioning systems. The company used to rivet them. Production of heads increased 700 per cent; labor cost dropped 87 per cent.

Amana Refrigeration Inc., Amana, Iowa, reports it boosted production in assembling aluminum sections of freezer liners 12 times with metal stitching. Material cost was cut 66 per cent. The firm used to fasten the liners with metal screws.

A manufacturer of auto parts cut material costs 66 per cent and boosted production 200 per cent in fastening rubber molding strips to auto fender skirts. Before, the molding was hand threaded around the skirt.

• Metal stitching resembles stapling in appearance.

Staplers use preformed fasteners. In metal stitching, a coil of wire is cut to length, formed, driven through the material, and clinched —all in one machine.

The high tensile, ductile wire is first formed into a stitch with legs of equal length, square cut, and free from burrs. The stitch is held in hardened steel grooves (in the machine) while pressure is applied to the crown, forcing the legs through the metal.

After the legs of the stitch have penetrated, they are folded against the underside of the metal as the crown is forced securely against the top surface.

• Practically any sheet metal that is not hardened can be stitched.

Materials that are being stitched include aluminum, copper, brass, hot and cold rolled steel, and galvanized sheets.

Bostitch

A stitcher forms and drives an oval stitch through the top edges of metal mesh fireplace screen curtains at Fred Meyer of California, San Francisco. It's twice as fast as applying hog rings by hand

Practically any unhardened metal can be handled. On jobs where the method can be used, savings are tremendous. Production goes up; costs come down

Acme Steel Co.

Amana Refrigeration Inc. found metal stitching 12 times faster than metal screws in assembling aluminum sections of freezer liners

Stitching is often used to join nonmetallics such as plastics, wood, cloth, and rubber to metal. Generally, the greatest economies can be realized on such jobs, says Acme Steel Products Div., Acme Steel Co., Chicago, builder of stitching machines.

The thickness that can be stitched depends on material hardness. Bostitch, East Greenwich, R. I., another builder of stitching machines, cites instances where cold rolled steel 0.085 in. thick (the thickness of two pieces) have been stitched. Aluminum up to 0.125 in. thick can ordinarily be handled.

• Users of metal stitching machines cite numerous advantages.

Shear, pull, and vibration tests show that the strength of metal stitching is adequate for almost any fastening job on which it can be used.

When overstressed, a stitch will open or loosen gradually, giving warning. Stitched parts can be disassembled without damage.

It's a fast assembly operation. One stitcher nearly doubled the output of two welders, states a metal cabinetmaker. It saves 80 per cent in labor costs, says a trailer manufacturer. In his plant, one man does a job in 2 hours that formerly took five riveters and spotwelders 6 hours.

Mating and clamping of the work are less critical than in spotwelding. Also, flange distance can be reduced, explains an aircraft builder.

With stitching, pieces can be prime coated before assembly, says a fabricator of sheet metal products. It also eliminates operations such as drilling, punching, and tapping which require skilled workers.

Dissimilar metals, such as steel and aluminum, that cannot be readily welded are easily fastened with stitches.

A brush manufacturer has found metal stitching a fast way to assemble brushes for lawn and industrial floor sweepers. Stitching bristles between steel strips replaced the old assembly method of forcing bristles into holes in wood. Production is up 350 per cent; the new sweeper has 50 per cent more bristles and lasts 50 per cent longer.

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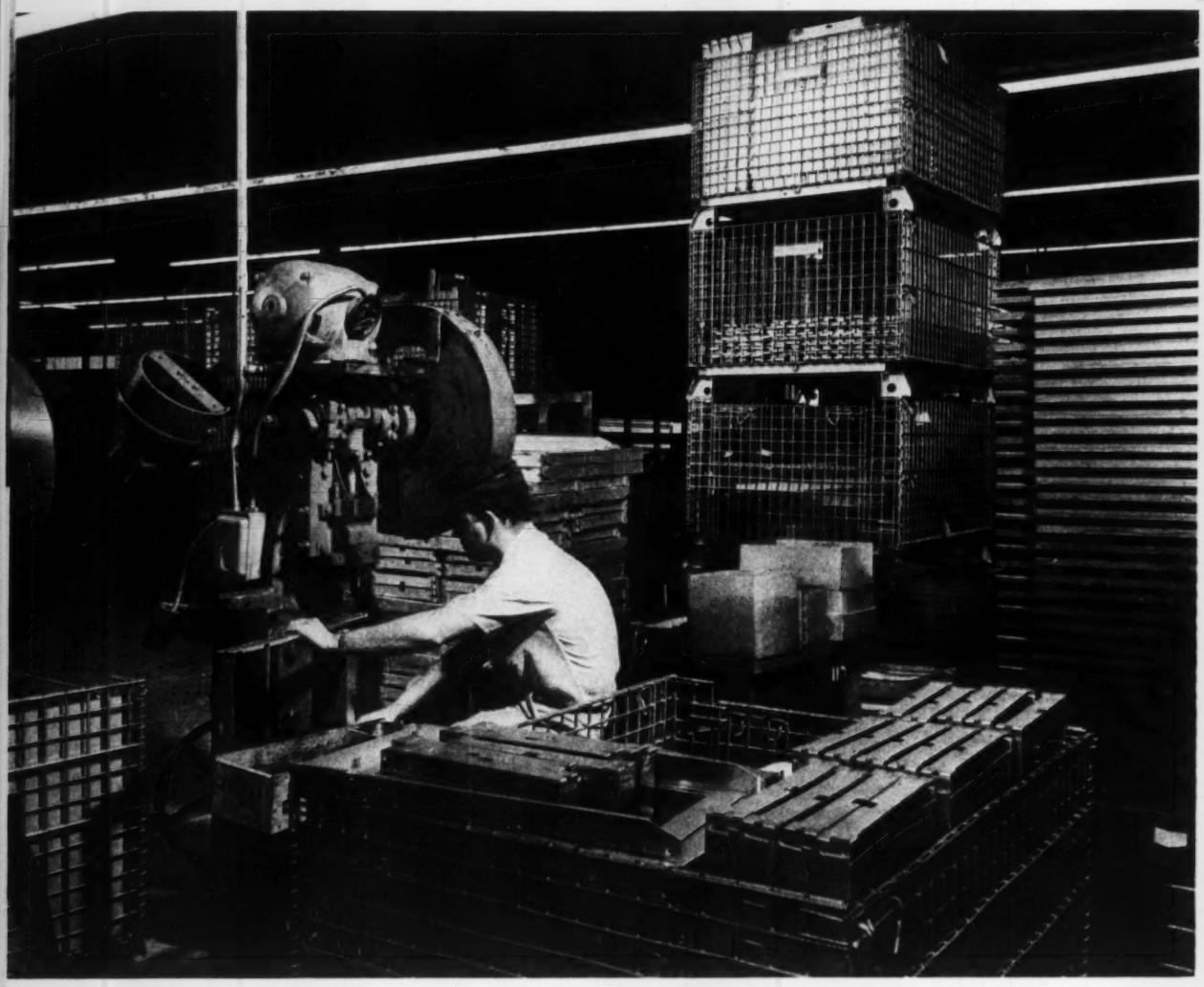
Wire Containers Stretch Storage Space



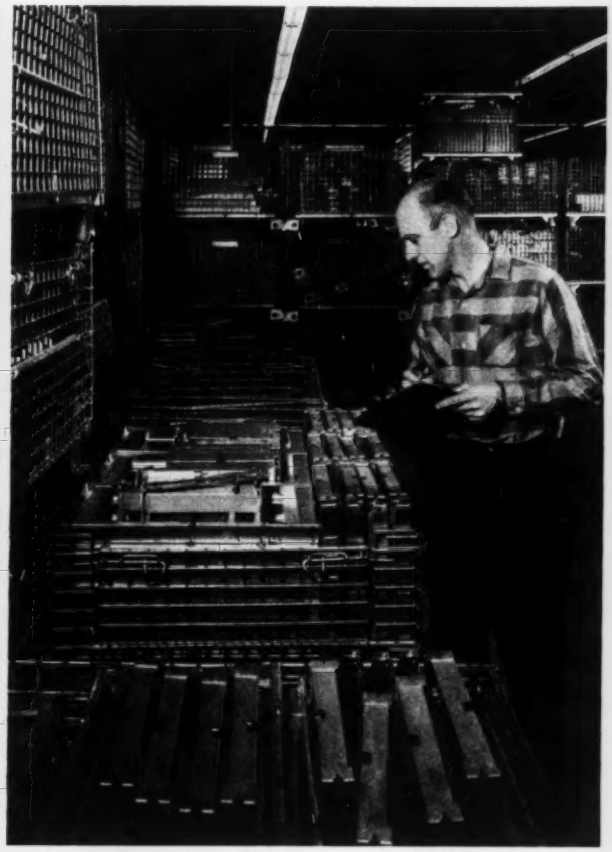
Part handling is eliminated between fabrication and subsequent operations. Lift trucks carry wire mesh containers to welding and assembly areas

Shift to the collapsible units reduced storage requirements 80 per cent at office furniture maker's new plant. They also made it possible to trim handling costs 25 per cent

COLLAPSIBLE wire mesh containers made it possible to reduce storage space requirements 80 per cent and handling costs 25 per cent at Haskell Mfg. Co., Oakmont, Pa., a maker of steel office furniture.

Plant Superintendent Edward Sohn explains: "We can use every inch of our 18 ft floor-to-ceiling space since we can stack the containers (called Cargotainers) five and six high without damaging them. There's no danger of toppling stacks. They're sturdy enough to take constant lift truck handling without being dented or damaged. We've never had to replace one because of damage."

• **Operations**—Parts like legs and drawer panels are fabricated from cold rolled sheet steel. In most cases, parts are blown directly into the container, eliminating the need for handling by the operator. Lift trucks move filled containers to stock storage. As parts are needed, they are moved by lift truck to welding or assembly areas. Emptied containers are either collapsed and stored or returned for reloading. Four collapsed containers occupy the same cubic space as one opened container.



The wire mesh containers permit safe stacking and visual inventory. A drop end affords easy access

Parts for processing at other plants are shipped in the containers. No handling or reloading is required

Haskell also uses the containers in two out-of-plant operations. Collapsed units are sent to an Ohio plant which fills them with parts it fabricates and ships to the home plant. Parts to be cadmium plated are shipped to another plant and returned in the containers, making handling and reloading unnecessary.

• **Dimensions**—With the exception of a specified partial drop end, the standard Pacemaker (made by Tri-State Engineering Co., Washington, Pa.) fills the company's needs. It uses 250 of them. Haskell says they have replaced all pallets and wooden boxes. Made of mesh (No. 2 gage wire) on 2 in. centers, each container measures 48 x 40 x 24 in., has a 5000 lb capacity.

With the drop end, contents are accessible when stacked, and reaching over the side is eliminated for seated workers in assembly operations.

What Cargotainers Offer

Handling Ease—The clear space between the floor and collapsible wire mesh containers used by Haskell Mfg. Co. facilitates moving by lift truck. The containers can be picked up from any angle.

High Stacking—A notch in each leg makes stacking safe. The stacks can't topple over.

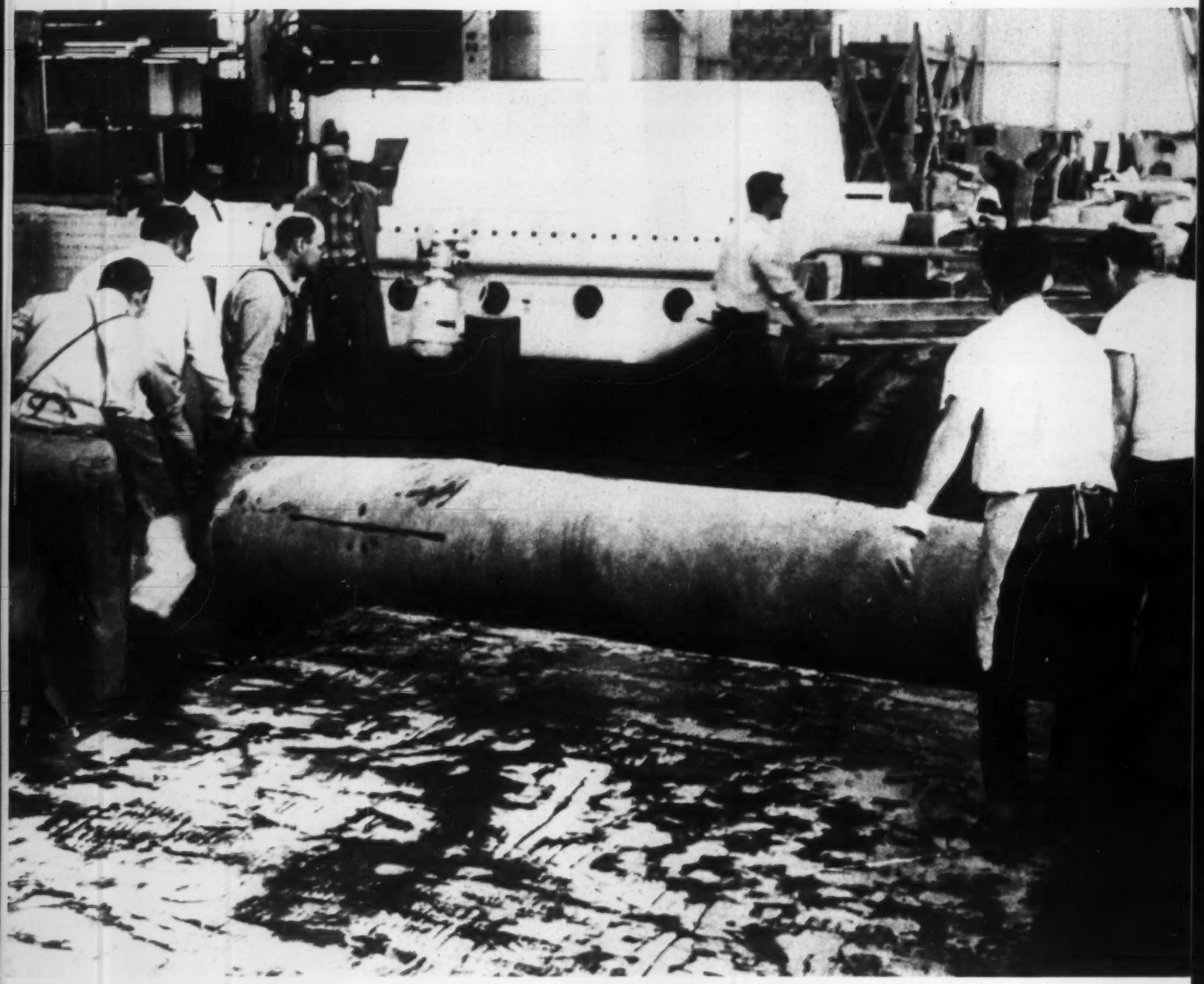
Long Life—Wire containers cost more than types previously used, but replacement is no longer a problem.

Visual Inventory—Type and quantity of parts stored in the mesh containers can be determined quickly.

Accessibility of Contents—With a partial drop end, a worker can reach all areas of stacked units.

Flexibility—Sending empty containers to other plants or suppliers to pick up parts normally would not be practical or profitable. The reverse is true with the collapsible units.

Strength—From 4000 to 5000 lb can be put into each container without damage or strain. Loads can be crowned above the sides.



Huge sheet of stainless steel is unrolled in front of 750 ton stretch press that will be used to level it

How Skin of B-70 Bomber Is Stretched

ONE of the many difficult production jobs that goes with building the B-70 is that of handling giant sheets of steel. North American Aviation Inc., Los Angeles, will use large sections of stainless steel in the skin of the Mach 3 bomber.

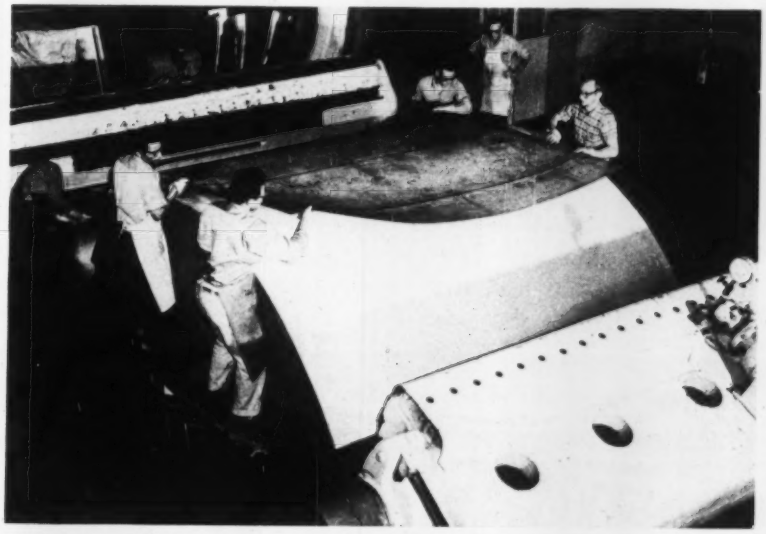
Engineers at Norair Div., Northrop Corp., Hawthorne, Calif., recently stretched one of the sheets to level it. The job was done on a 750 ton Sheridan stretch press. It took 90 to 100 tons to pull the sheet over a die the size of a Quonset hut.

The steel was stretched, annealed, then given a final stretch. The sequence pulled it to a 3 per cent elongation.

The cycle also was used to pull a $\frac{1}{4}$ in. plate of copper that will be used for tooling.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

The sheet is 15-7 Mo stainless steel that's 10 ft wide, 22 ft long, and 0.020 in. thick. Die is as big as a Quonset hut. The leveling cycle: First stretch, anneal, final stretch



Workers lift sheet onto press, pulling it toward large chuck in foreground

First stretch makes sheet smooth, level. Anneal and final stretch follow

Heat Transfer Unit Lops 32 Minutes Off Heatup

Heatup time has been cut 17.5 per cent by a redesigned heat transfer unit made by Tranter Mfg. Inc., Lansing, Mich.

The test was performed in a rinse tank (at Ideal Finishing Co., Lansing, Mich.) where an older model made by Tranter had been used for several years for heating water in a 600 gallon rinse tank. Operating temperature is 200° F.

With steam at 15 psi, 182 minutes were required for the older unit to heat the water from 60 to 204° F. At the same steam pressure, the new unit (called Multi-Zone Plate-coil) heated the water from 60 to 203° F in 150 minutes.

The tests were run under identical conditions, with each unit occupying the same place in succeeding tests.

The savings shown by this test would total 26 hours annually where the rinse bath is cut down once a week. If daily heatup is required, more than 130 hours would be saved. That also saves direct labor costs and overhead.

The new units are made from two embossed sheets of metal welded to form channels for heating or cooling media.

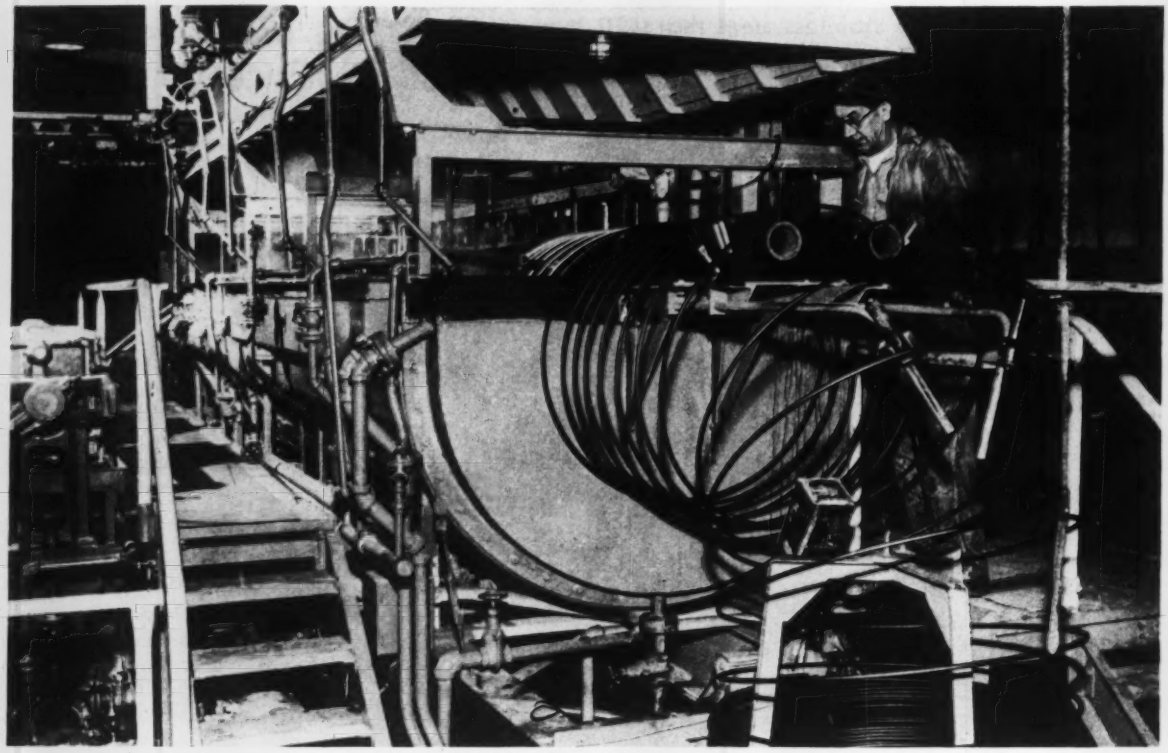
In the old model, one common steam header extended the width of the unit, feeding all of the lateral passages that carried the steam across the unit to the common condensate return.

In the redesigned heat transfer unit, the header is divided into three branches. Steam is carried directly to all areas simultaneously.

Brazes Brass and Steel

Brass and steel valve bodies are assembled quickly and easily with a brazing setup developed by Induction Heating Corp., Brooklyn, N. Y., for Standard Machine & Mfg. Co., St. Louis.

The same induction coil is used for three assembly sizes. Changing from one size to another requires only slight adjustment of heating cycle and fixture height. It takes 40 seconds to braze two brass parts, or 30 seconds for one steel part. Sleeves are brazed to valve bodies without overheating or damage to finished threads.



Electrolytic plating unit deposits a 0.0002 in. copper coating on a continuous strand of stainless steel wire, as it spirals through the tanks

Machine Copper Coats Wire For Better Cold Heading

Metal film serves as a lubricant when stainless steel is made into bolts and other fasteners. Previous method didn't leave a uniform deposit on the wire

FASTENERS made from copper coated, stainless steel wire have superior strength and grain structure, claims Republic Steel Corp. The coating, which is applied in an electrolytic plating machine at the company's Massillon, Ohio, plant, serves as a lubricant in the production of such products as bolts, nuts, and screws by cold heading.

• The copper coating is applied to a continuous strand of wire as it spirals through an electrolytic plating machine.

Wire 0.092 to 0.625 in. in diameter is fed through the plating machine in a continuous strand, which is preformed to a 36 in. diameter.

Continuous coils assume a helical form as they pass through the machine.

A protective coat of copper, 0.0002 in. thick, is applied to the wire. Finished fasteners are usually dipped in nitric acid to remove the copper.

Formerly, the coils were oxide coated, then drawn through a stearate compound. Lack of uniformity in coating thickness, bare spots, and flaking prompted Republic to adopt the new plating process.

• Cold drawn wire is annealed and pickled before plating.

Hot rolled rods are annealed, pickled, and drawn to within a few thousandths of finished wire diameter. The wire is then annealed and pickled.

In the plating machine, coils pass through a degreasing bath and a cold water rinse, which prevents carryover of degreasing solution to other plating tank compartments. Strands then pass through a sulfuric acid cleaning bath, a second water rinse, and a hydrochloric acid dip tank. A final water rinse precedes plating.

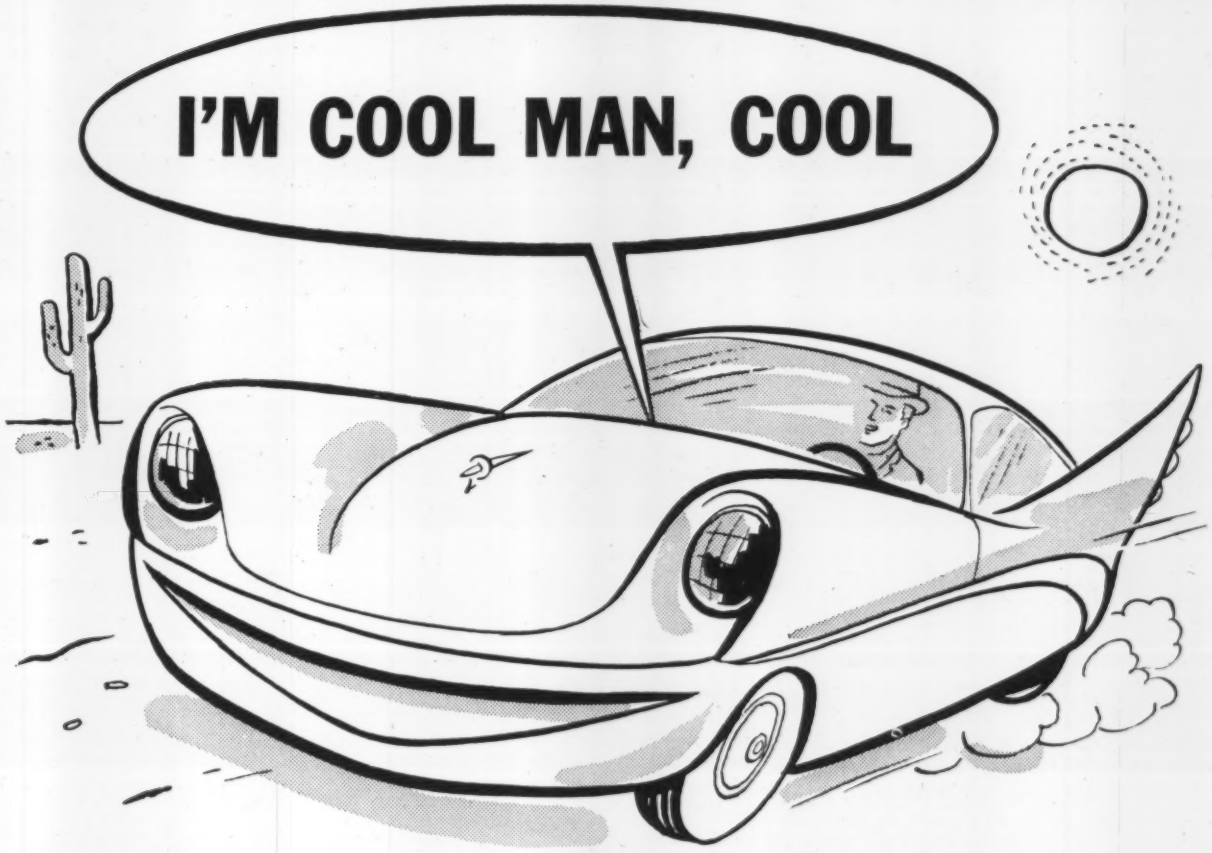
• Nickel, applied before the copper plate, insures a good bond with the stainless steel.

The wire passes through a plating solution that deposits a flash of nickel on the stainless steel surface. Coils then go through a water rinse and a caustic solution that neutralizes any acid remaining on the nickel.

Then the material goes through the copper plating solution, a cold water rinse, and a hot water rinse.

AUTO AIRCON STEEL CABLE V-BELTS
from the POWER UNLIMITED complete belt line

I'M COOL MAN, COOL



The U. S. Auto AirCon Steel Cable V-Belt has everything required in a belt for air-conditioning use. Here is a V-belt that's in a class by itself. It is equipped with pulling cords of steel. A new patented curing method and electronic tensioning of the steel cords *free this belt from vibration.* It transmits power smoothly, quietly and efficiently—in present automotive air-conditioning service, lasts 1½ to 2½ times longer than any other V-belt. Here are the unequalled advantages the engineers point out:

- All steel cable members lie in the same plane.
- Wire cable members are straight, never wavy.
- Absolute uniform top width and belt thickness for better seating in pulley.
- Perfect dynamic balance.
- Use of knurled mold insert provides maximum traction and alignment of outside idler.

Our field engineers stand ready to consult with you on any or all V-belt problems. Drop us a line at address below.

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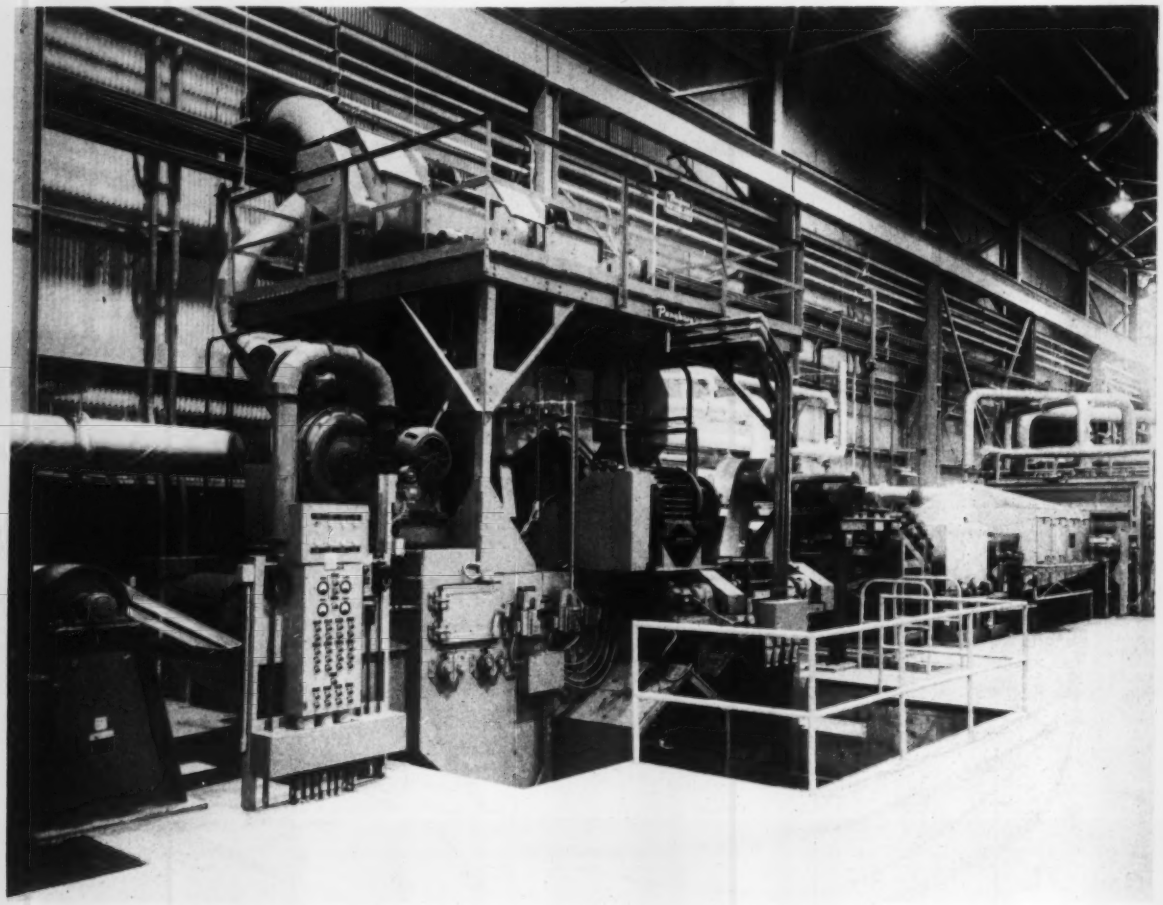


Machine processes stainless coils automatically, after the operator presses control buttons to select the degree and direction of blast required

Blast Descaling Reduces Pickling Cost

Shotblasting machine removes scale from stainless steel strip before it's pickled. That means less time in the pickling tanks and lower all-round processing costs

MECHANICAL descaling of steel strip before chemical cleaning reduces the time metal must remain in the pickling tanks. The saving puts a big dent in processing costs.

One firm benefiting from the technique is Universal-Cyclops Steel Corp., Bridgeville, Pa. It uses a shotblasting machine to clean stainless steel coils at its Coshocton, Ohio, plant. Equipment was supplied by Pangborn Corp., Hagerstown, Md.

- **The entire line is continuous and automatically controlled.**

Steel strands, passing through the blast machine, are descaled on both sides, at line speeds up to 80 ft per minute. (Speed depends on the time required for complete cleaning.)

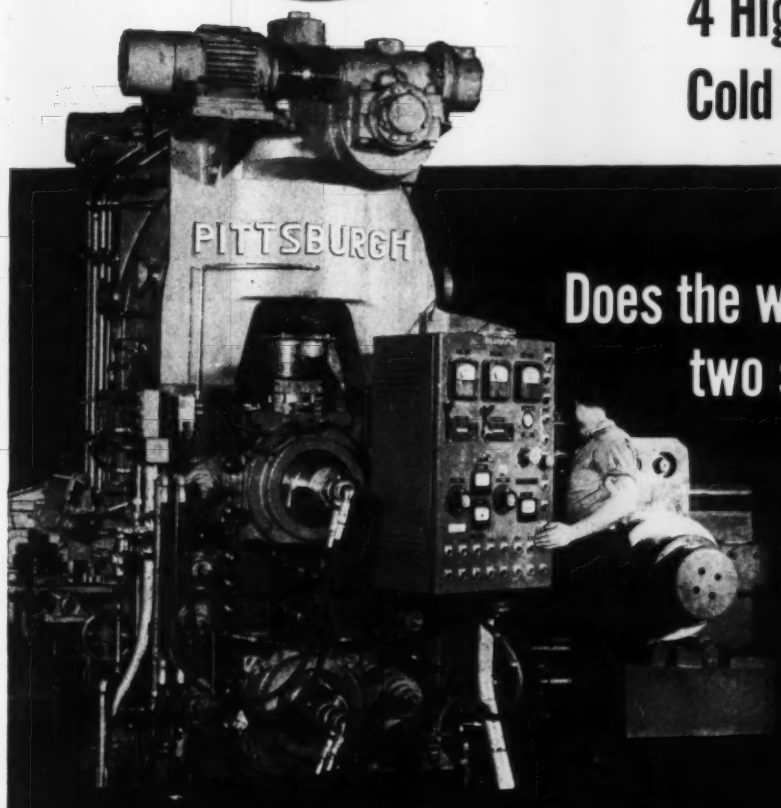
The unit is at the center of the 659 ft, automatic, intermediate annealing and pickling line. It is used to clean 300 and 400 series stainless strip 0.040 in. or thicker. Coils are brought to the Coshocton plant from the company's facilities at Bridgeville, Pa., or Mansfield, Ohio.

- **Three shot throwing wheels** are

(*Please turn to Page* 122)

PITTSBURGH

Combination 4 High/2 High Cold Mill . . .



Does the work of two separate mills

"Precision" and "Versatility" are the words that best describe the new combination 2 High 4 High Cold Mill designed and built by PITTSBURGH to secure precision gauge, temper and finish for the ferrous and non-ferrous industries. As a 4 High Mill, it is used for cold reducing; as a 2 High Mill, it is used to acquire the desired temper and finish. Several desirable design features are incorporated to keep roll change time to a minimum. Low initial cost and economical operation are attractive plus values.

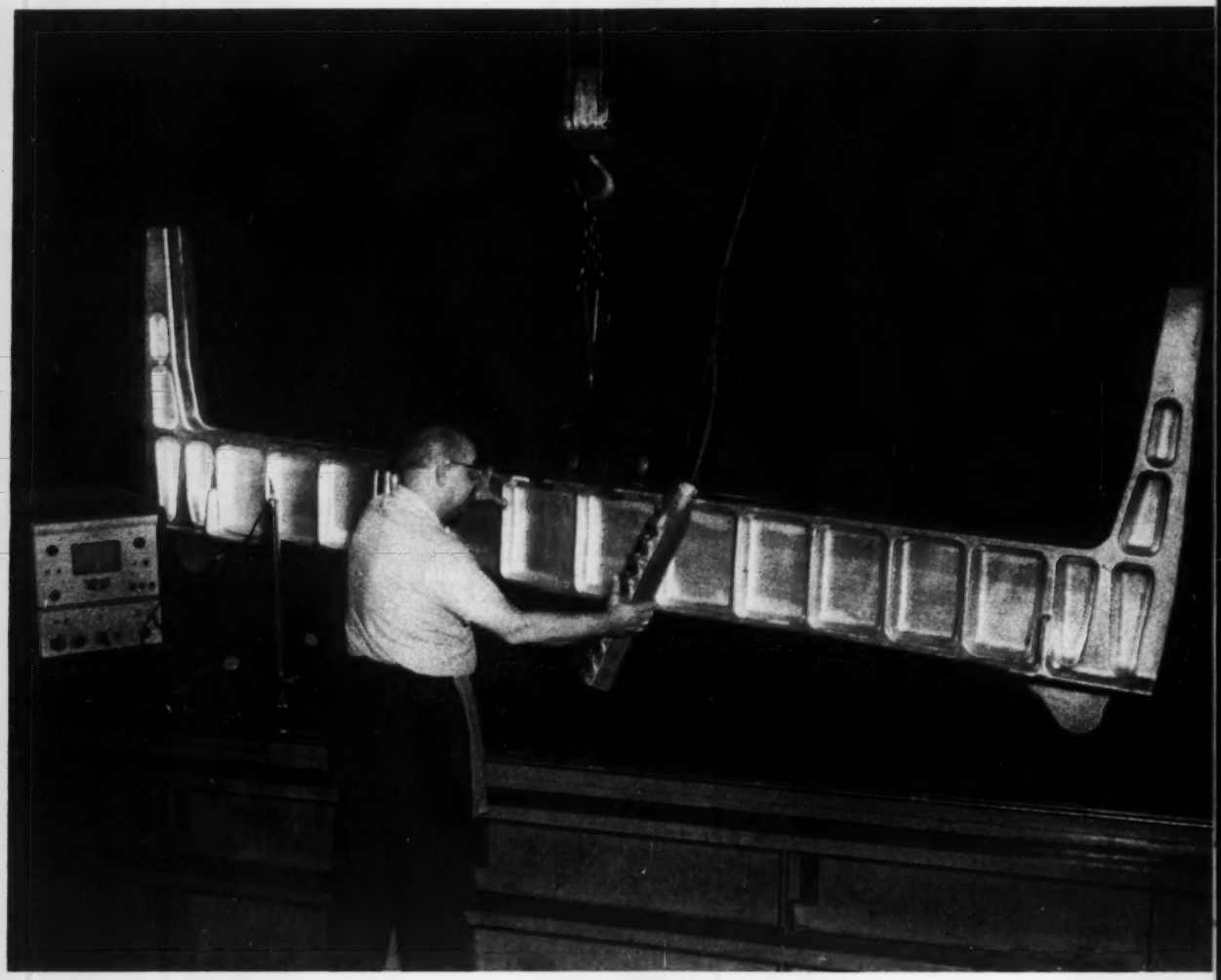
"Electric and open hearth steel castings from 1 lb. to 100 tons"

HEAVY MACHINING FACILITIES

Our plant is equipped with a superior complement of well diversified machine tools that are available on a continuing basis for economical machining of heavy castings or the manufacture of auxiliary rolling mill equipment, such as heavy mill tables, furnace pushers, slab depilers, downcoilers, ingot buggies, slab transfers, etc.

PITTSBURGH
ENGINEERING & MACHINE DIVISION
Pittsburgh Steel Foundry Company
TEXTRON, INC.

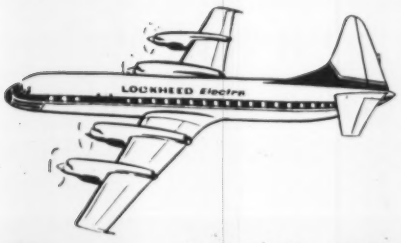
BOX R, GLASSPORT, PENNSYLVANIA · PLANTS AT GLASSPORT & McKEESPORT, PA.

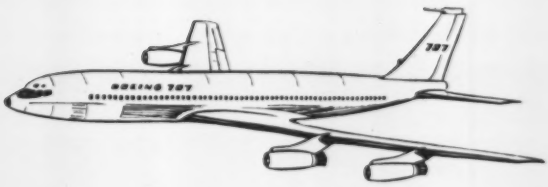


Largest closed-die forging ever made for commercial aircraft

The forging of these 657 lb. bulkheads presented unusual problems—problems of die design, of forging, and of handling. The successful solution of these problems saved a costly assembly of many smaller parts—costly both in terms of dollars and pounds.

This is a typical Wyman-Gordon accomplishment —the result of over seventy-five years of forging experience, and today supported by the greatest range of heavy forging equipment and technical know-how in the industry.





Over 1000 Wyman-Gordon forgings pace advanced jet designs

In saluting the great achievement of America's commercial jet leadership, Wyman-Gordon takes great pride in having participated so extensively in the development of the aircraft industry from its very beginning.

In World War I, the use of forgings was confined to engine parts and Wyman-Gordon made most of them. Today, from the huge main bulkhead forging at the left to the engine parts below, Wyman-Gordon forgings are in the wings, fuselage, landing gear and engines of the four newest commercial jet aircraft. These and a great variety of other vital components are forged from many types of materials: aluminum, magnesium, titanium, steel, as well as many new uncommon alloys.

EST. 1883

In the highly stressed parts of modern aircraft, there is no substitute for forgings and in complicated forgings of difficult alloys, there is no substitute for Wyman-Gordon quality and experience. We are prepared to serve you at the design, engineering and purchasing stages of your developments.

WYMAN-GORDON

FORGINGS

of Aluminum Magnesium Steel Titanium . . . and Beryllium Molybdenum Columbium and other uncommon materials

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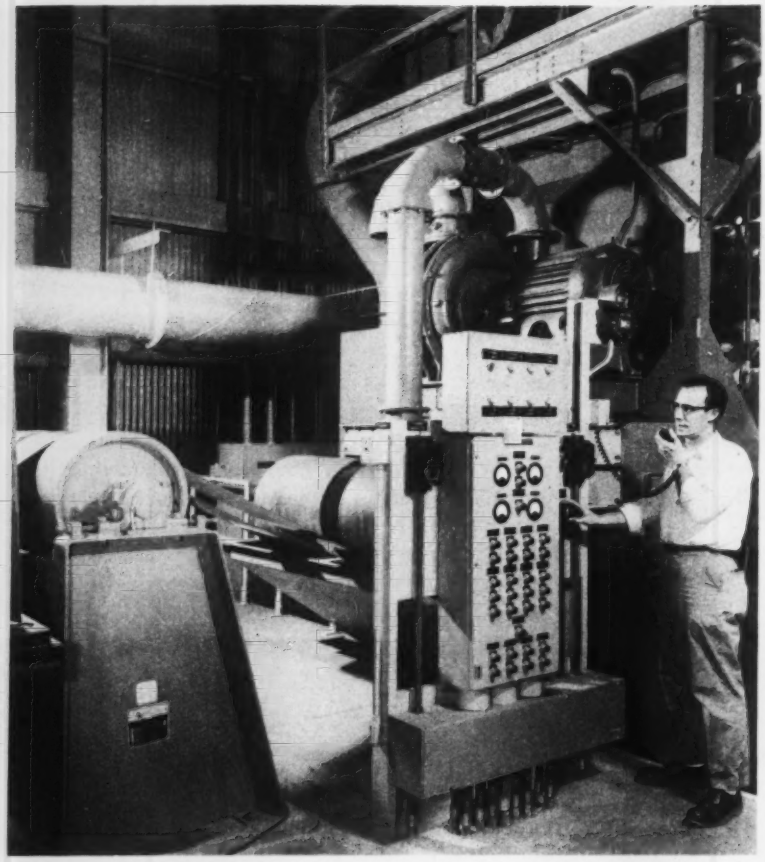
GRAFTON MASSACHUSETTS FRANKLIN PARK ILLINOIS LOS ANGELES CALIFORNIA FORT WORTH TEXAS

BLAST DESCALING . . .



Individual strand control permits two coils of stainless strip to be processed in the descaler at the same time but at different line speeds

(*Concluded from Page* 118)

positioned to give all strip surfaces complete blast coverage.

Velocity and volume of steel shot thrown by the machine are easily regulated. Centrifugal wheels are driven by two speed, constant torque motors. Power used: 50 hp at 1200 rpm, or 75 hp at 1800 rpm, depending on the type and thickness of stainless on the line.

Automatic orifice control on the centrifugal wheels regulates abrasive flow.

The blast cabinet is lined with wear resistant plates to keep maintenance costs down; the floor mounted machinery doesn't require a pit.

The machine handles two strands of steel at once. Individual strand control means the two coils in process can travel at different line speeds.

Position of blast wheels can be changed by pressing a button on the control panel. That aims abrasive streams where they'll do the best cleaning job on different strip widths handled by the line.

• **Abrasive cleaning and recycling equipment are built into the machine. A dust collection system prevents contamination of the surrounding area.**

Spent abrasive falls into a hopper. It is taken from the hopper by a screw conveyor and loaded on an elevator conveyor, which moves it into an air wash abrasive separator.

Cleaned abrasive then moves into a storage bin. Feed chutes with air cylinder operated control valves deliver shot to the centrifugal wheels.

A self-cleaning dust collector, exhausting air at 12,540 cfm, is used with the descaler. Constant air volume and vacuum and uniform air flow resistance help keep machines and surrounding areas dust-free.

Lift Truck Mufflers Cut Air Pollution

Unburned contaminants are changed to CO_2 and water vapor by a catalytic purifier

A USER test of catalytic exhaust mufflers on fork trucks (powered by liquefied petroleum gas) showed a 98 per cent conversion of carbon monoxide. Concentrations were reduced to that amount throughout the entire range of speeds and load changes. Irritating aldehydes were reduced 96 to 98 per cent. Completely eliminated was the ethyl mercaptan odor usually associated with LPG engines.

Hydrocarbon reduction could not be field tested. Earlier evaluations by the mufflermaker (Oxy-Catalyst Inc., Wayne, Pa.) show a 90 per cent reduction. Infrared analysis equipment was used.

The purifiers replace acoustical mufflers. They channel the hot exhaust gases through a catalytic agent.

Incompletely burned contaminants in the exhaust gases are changed to harmless carbon dioxide and water vapor.

The purifier was tested when U. S. Steel's Gary Sheet & Tin Mill (Gary, Ind.) switched its fleet to LPG power. The fume problem was anticipated (especially in loading and unloading boxcars). Despite oft expressed beliefs that LPG fueled trucks are fumeless, Oxy-Catalyst says even the "better behaved" LPG engines produce 50 to 75 per cent as much fumes as gasoline powered vehicles. Used in the test program were a 7000 lb automatic fork truck and a 10,000 lb Yale & Towne unit.

Contaminant levels were tested (before and after installation of the purifier) with an Orsat gas field analyzer. It meters exactly 100 cubic centimeter of sample gas and then washes the gas in three different absorbers. The absorbed elements are registered as percentages of the original sample.

Carbon monoxide concentrations smaller than 0.10 per cent by volume were measured by a Mine Safety Appliances squeeze bulb unit. Ratio of gas to fuel was measured with a standard meter.

WHAT'S IT TO YOU IF P&H IS 75 YEARS OLD?

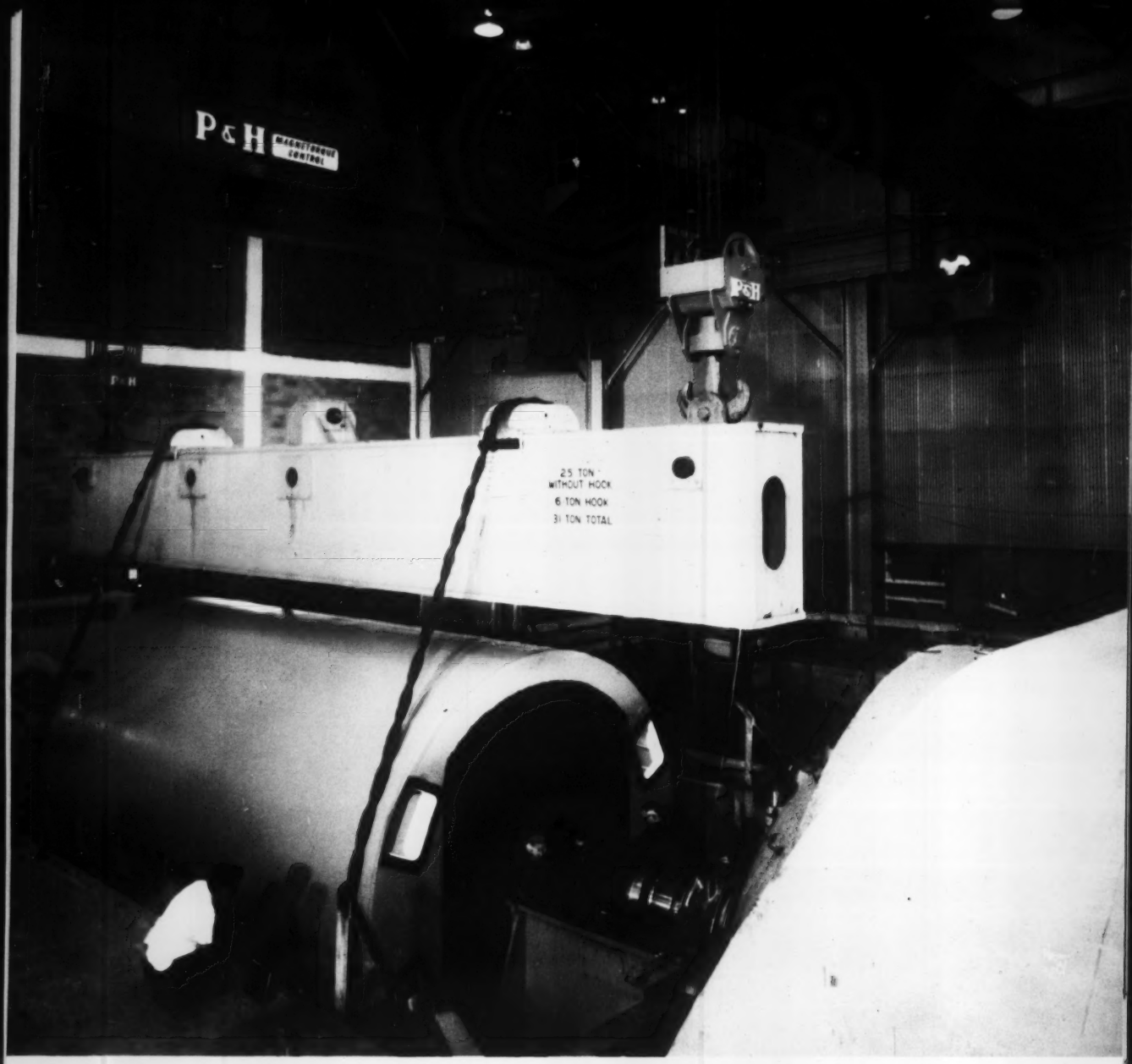
Some companies point with pride to their long years of experience. Perhaps they believe that age alone is a compelling reason for customers to choose their product.

But at Harnischfeger Corporation we don't believe you buy leadership in any field just by putting in time. You have to go out and win it — with a product that's better than the other fellow's, with service the customer can depend on. And once you've reached the top, you can't stand still.

How do you stay on top? The answer is you work at it, year after year. You study field reports, correct mistakes, make design improvements as you go along, explore new ideas, develop new products, testing and retesting them under every imaginable condition until you *know* they work. Result? Harnischfeger has led the way in crane and hoist design with the really big "firsts" — Magnetorque, Electronic Stepless Control, RCD hoist brake, Balanced Design Hevi-Lift hoists, just to name a few of the most recent.

We've been at it for 75 years now, and the score is pretty impressive. Harnischfeger has made, sold, and installed more overhead cranes and hoists than any other company in the world. Isn't experienced leadership like this an important consideration when you purchase your next crane or hoist? Let Harnischfeger bid on *your* next inquiry — and prove it! Harnischfeger Corporation Milwaukee 46, Wisconsin.

P&H HARNISCHFEGER
...quality and service for 75 years



FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING...

IN POWERHOUSES: You're looking at a giant stator being carefully "hairlined" into place at a new Midwestern powerhouse . . . a job this pair of herculean P&H cranes handles with precision *Magnetorque* control despite the fact the load exceeds 200 tons.

P&H's *total* control of massive loads permits faster, safer moves . . . and this is true whether you make occasional lifts in powerhouse service or constant lifts in production. Whatever your service, this kind of fast, safe, dependable performance means lower maintenance, operating and handling costs.

What's more, when P&H cranes become part of *your* material handling picture, you're assured of single-source responsibility for every structural, mechanical, and electrical part for the life of the crane. Service is quick and competent . . . straight from Harnischfeger, the world's largest crane manufacturer. Why not investigate the possibilities Harnischfeger offers to meet your job requirements today? The whole story is waiting for you in Bulletin C-6. Write for your free copy to Dept. 110, Harnischfeger Corp., Milwaukee 46, Wisconsin.

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...quality and service for 75 years

OUR 75TH YEAR

Steel Aircraft Challenge Production Men

One expert fears it may take 50 years for major aircraft firms to convert their facilities to the steel airframe. Others cite inadequate knowhow for real efficiency

SOME aircraft production men are concerned about the transition of facilities for the switch from the aluminum to the steel airplane. Many are convinced they will not be able to maintain their present production pace.

Listen to F. A. Monahan, manager of manufacturing development and process specifications, Convair Div., General Dynamics Corp., San Diego, Calif.: "In machining, we have about a 50 to 1 disadvantage in steel vs. aluminum. Even if we could coax out a 500 per cent improvement in our steel abilities, we'd still be at a 10 to 1 disadvantage over the jobs we're used to doing."

The implications, says Mr. Monahan: "We'll need either ten times the present facilities, or ten times the time if we're to produce normal quantities."

• Equipment transition, already underway, may take a long time.

At North American Aviation Corp., Los Angeles, some skin mills have new heads and spindles that will machine at the lower steel speeds. The conversion is typical of those being made throughout the industry. It also reflects the trend in new equipment purchases in which machine tools are eyed for extra rigidity and more power at lower speed ranges.

But at current industry replacement rates, the conversion to steel capability could be a long way off. Convair's Mr. Monahan guesses it could take as long as 50 years for the eight or nine major airframe makers to get set for steel.

• Some cut resistant high alloys may force equipment builders back to the drawing boards.

At Convair, a rugged, modern lathe was specially instrumented for high speed machining of steel, using CO_2 as a coolant. Although the process showed promise, the machine spindle bearings wore out. To survive the heavy loads, bearings had to be tightened up, but when the bearings were tighter, they could be used only at relatively slower speeds. Although the CO_2 offered speed advantages, the machine limited the speedup.

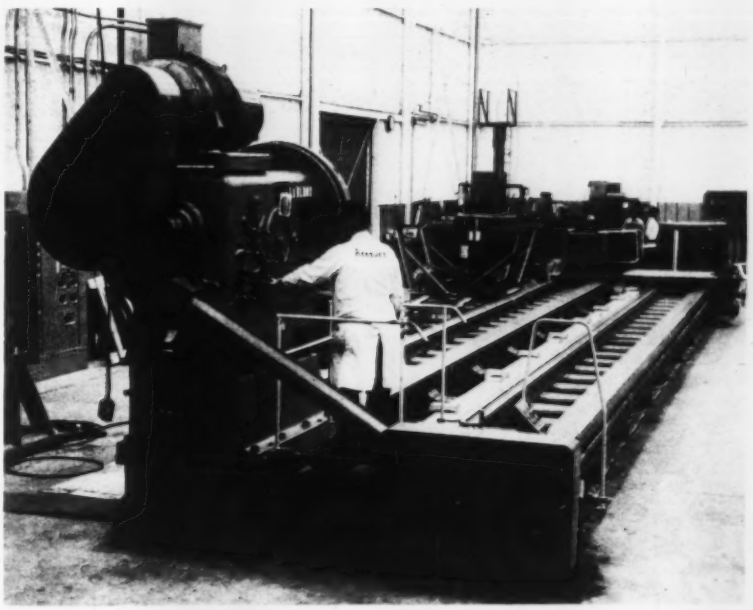
There are similar process and equipment limitations at nearly every step in the manufacturing sequence. At no point is the processing impossible, but at most stages it's costly.

Although some of the companies (and the government) are beginning to pour money into equipment for their new jobs on steel, they lament the lack of techniques, equipment, and knowhow they need.

AMTDA Officers Elected

Members of the American Machine Tool Distributors' Association elected officers at their 35th annual meeting in St. Louis. J. Russell Clark, president, White Star Machinery & Supply Co., Wichita, Kans., is the association president. Vice president is George E. Merryweather, president and treasurer, Merryweather-Strasmann Machinery Corp., San Mateo, Calif.

I. B. Rabel, president, Star Machinery Co., Seattle, is second vice president of the distributor group, and C. D. Day, vice president, Machinery Associates Inc., Wynnewood, Pa., is secretary-treasurer.



75 TON, DOUBLE BED LATHE is used in the manufacture of large pressure vessels at the Azusa (Calif.) plant of Aerojet-General Corp. The fabrication process (called AeroWrap) makes high strength, lightweight, cylindrical chambers by adhesive bonding of helically wrapped thin metal strips. The lathe (it measures 10 x 54 ft) was made by R. K. LeBlond Machine & Tool Co., Cincinnati

two more cases where PARTS PRODUCED FROM provide excellent bearing properties

CASE HISTORY

MUELLER BRASS CO. 600 ALLOY screw machine product used in heavy duty farm equipment

This heavy duty planetary pinion shaft, made as a screw part from tough "600" series bearing alloy, was the answer to a continuing wear problem encountered in the driving mechanism of heavy-duty farm equipment and big trucks. The part is machine produced to exacting tolerances and all necessary finishing operations are done by Mueller Brass Co. so the pinion shaft is ready for installation when received. Since "600" alloy parts have been installed, no operating failures have been reported and the shafts have proved far superior to the material formerly used.

MUELLER BRASS CO. ANALYSIS SERVICE

You get sound, unbiased advice on the one best method of making your parts because Mueller Brass Co. is the only fabricator in the country offering all these methods of production. An experienced Methods Analysis Department has at its command a complete knowledge of the advantages and limitations of each production process. This unique technical service is your assurance of getting the best product at the best price . . . made the one best way!

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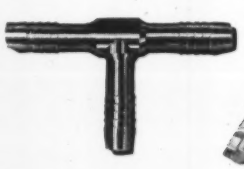


PLASTIC INJECTION MOLDING

MUELLER BRASS CO.

MUELLER BRASS CO. 600 ALLOY

and maximum wear resistance in tough applications

CASE HISTORY

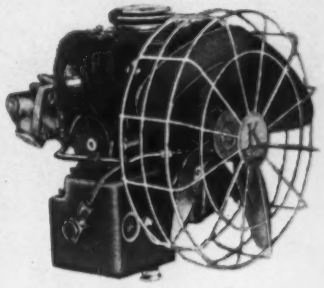
MUELLER BRASS CO. 600 ALLOY forgings used in aviation air compressors

Analyzing the job requirements of Walter Kidde & Company, Inc., for a main driving cam component to be installed in a reciprocating type of aircraft air compressor, Mueller Brass Co. Methods Analysis Engineers decided on a forging fabricated from "600" alloy as the most practical method of production. Since the cam forms the prime component of the driving mechanism, it must have good bearing wear surfaces and because the compressors are used in the aviation industry, the cams must be completely dependable. The close grained, strong forging that resists combination compressive and tensile stresses was the answer.

A typical compressor takes in ambient air and compresses it to 3000 psi or higher. This high pressure air is stored in metal or fiberglas containers until needed for actuation of pneumatic system components such as solenoid control valves, brake valves, manual control valves or actuators. These and other pneumatic units retract the entrance door, operate landing gear, wheel brakes, nose wheel steering systems, propeller brakes or perform other functions.

Aircraft in which Kidde compressors are installed include the Boeing 707, the Douglas DC-8, the Lockheed Electra, the Fairchild F-27 and various military aircraft.

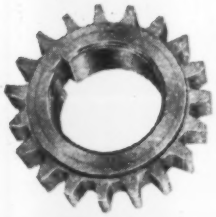
Mueller Brass Co. produces press, hammer or cored forgings of any practical shape from a few ounces to 150 lbs. in brass, bronze, aluminum and magnesium in 27 standard, as well as special, alloys.



Aircraft air compressor equipped with hydraulic drive delivers air compressed to 3000 psi at the rate of 6 cfm.

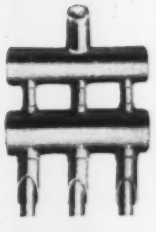
This yoke forging is lightweight, yet strong; has excellent bearing wear surfaces.

Forging is part of the main cam, the prime component of a modified Scotch-type yoke, which is the piston driving mechanism in the air compressor.



POWDERED METAL PARTS

SAND CASTINGS



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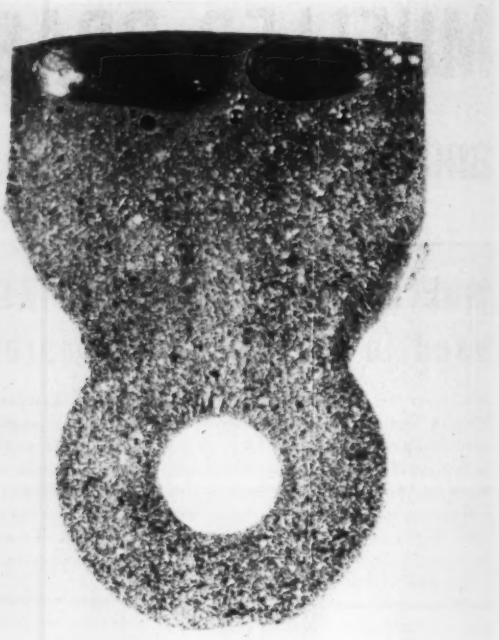
Molybdenum skull casting weighs 8 lb



Cross section of 8 lb casting—porosity is confined to top

Casts Refractory Metals In Graphite Molds

The process, which is expected to simplify the production of tungsten and molybdenum parts, depends on furnace and handling methods, report researchers at Westinghouse

FOR MANY years, the forming of refractory metals required powder metallurgy methods. The use of other processes hinged on the development of furnace equipment and methods for melting the materials at high temperatures. Now, laboratory work at Westinghouse Electric Corp., Blairsville, Pa., shows that skull melting can be used to produce molybdenum, tungsten, tantalum, and columbium castings. The method is expected to simplify the production of complex shapes.

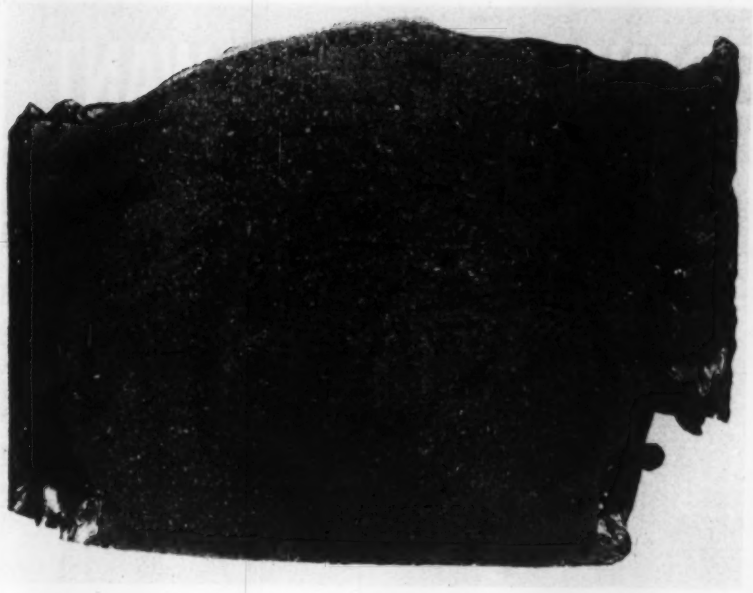
• **Graphite Molds** — To hold the metal as cast from the melt, graphite molds were made up. There was some pickup of carbon from the molds, and heavier sections showed more carbon penetration. Cleaning up the carburized area (if experience proves it to be necessary) will require less machining than is now being done on forged parts, say D. R. Carnahan and L. M. Bianchi, Westinghouse researchers.

Grain size of a molybdenum casting weighing 8 lb was small compared with that of an arc melted ingot of the same diameter. In an experimental casting the oxygen content ranged from 75 to 46 ppm, which is higher than that of vacuum arc melted ingots made of the same material, and there were numerous gas holes. The reason is believed to be outgassing of the mold or the short time involved in the melting and casting method, which might not allow as much reaction with carbon.

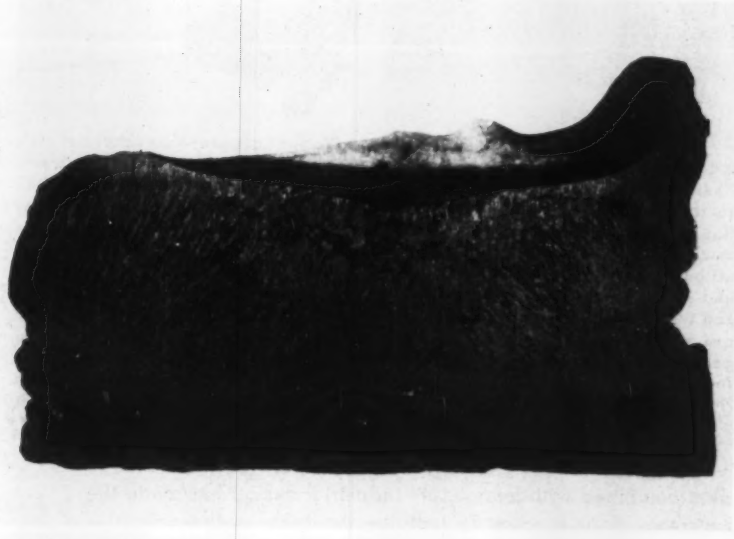
The shrinkage hole, confined to the top of the casting, indicates that progressive solidification was achieved.

• **Furnace Problems**—The absorption of carbon from the molds highlights a major problem in melting refractory metals—no known crucible material is satisfactory. At the temperatures and purities used, contamination from the container is potentially serious and could vitiate the process. Vacuum arc skull melting (STEEL, Mar. 9, p. 64) is the only technique found by Westinghouse with the potential of making large castings of refractory metals.

Complicating the problem still further is thermionic emission—the principle used in vacuum tubes. Loss of electrons causes a loss in temperature at the cathode, a gain at the anode; since emission is a function of the square of the absolute temperature, the high melting points of tantalum and tungsten



Electrode was positive in melting this 50 tungsten-50 molybdenum alloy



Same composition, electrode negative; crystal structure shows deep molten pool

make its effect pronounced.

Even with columbium (in a test with a consumable electrode), the melting rate of the electrode was doubled when its polarity was switched from negative to positive. Cross sections of melts of an alloy containing equal parts of tungsten and molybdenum illustrate the difference—using slightly over 3000 amperes for 2 minutes with a positive electrode, no pool was obtained, while with a negative electrode, only 2700 amperes for 2 minutes gave melting of almost the entire bath. Use of the negative electrode requires precise control of the arc, since the anode surface becomes extremely hot in a localized area.

Messrs. Carnahan and Bianchi believe that vacuum skull casting will ultimately prove to be a practical method for producing refractory metal shapes.

Precise Welding Passes Arctic Test

PRECISION welding made possible successful production of base rings for radomes used in the Ballistic Missile Early Warning System near Thule, Greenland, says Wickwire Spencer Div., Colorado Fuel & Iron Corp., Wilmington, Del.

The precision is needed to combat the effects of extremely low temperatures which provide a rigid test of metal structures.

A special analysis, 3½ per cent nickel steel is used to combat low temperature brittleness; tight fabricating tolerances make field fitup much easier.

The rings form a circular track for huge rotating radar antennas. Ten sections of welded plate box girders make up each of the 108 ft diameter rings.

All plates were cut into ten patterns, sandblasted, pickled, and phosphatized. Each pattern was about 32 ft long and had some 100 anchor bolt holes in the top flanges.

All welds used were the grooved, full penetration type. After welding, lengths and hole locations were checked on full size layout plates for tolerance variations within 1/16 in. Wickwire Spencer employed assembly and welding jigs to achieve the tolerances needed.

Continuous Casting Trims Impact Extruder's Costs

Aluminum impact extruders can save material costs with stock produced by the continuous casting technique developed by Kaiser Aluminum & Chemical Corp., Oakland, Calif.

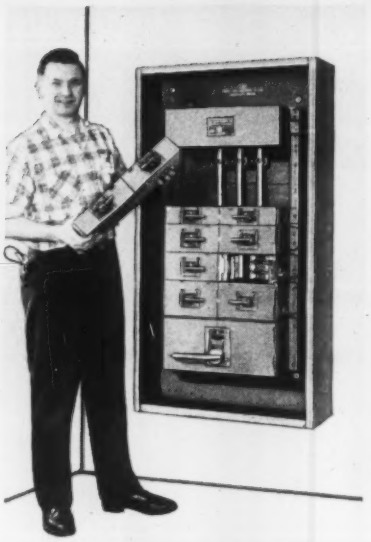
Both "K-Slab" and slugs blanked from "K-Slab" are being supplied where a cast metal structure is acceptable. The slugs are suitable for a wide variety of thin and heavy wall tubes, cans, containers, and other parts. The company also supplies a variety of alloy sheet slugs and "rod-type" slugs.

"K-Slab" comes in thicknesses of ⅜ to 2 in., widths of 6 to 12 in., and lengths of 12 to 240 in. You can get it in the 1100 series of alloys and higher purity grades.

EXACTLY THE PANELBOARD YOU WANT

Right Off Your Square D Distributor's Shelf!

In our contracting business, we find QMB PANELBOARDS are just the thing for heavy industrial jobs. The switches are heavy-duty horsepower rated and they plug in just like plug-in duct units or drawout air circuit breakers. The switch unit I'm holding is a twin 60 ampere 3-pole unit, rated 600 volts. We picked up the entire panelboard this morning from our local Square D distributor's stock to use on a 480 volt job. *We'll have it installed and wired by tomorrow afternoon—and no overtime.*



Notice that this 240 volt switch is much smaller than the 600 volt unit. That means we can put more circuits in the same size panelboard. Since Square D started making these new smaller units, we've been using QMB on all our commercial jobs. The interiors and boxes are the same for both 240 and 600 volt panelboards. That means one stock can work for both. *We can get the complete panelboard from our local Square D distributor the same day the job develops.*

We don't gang separate safety switches and motor starters over a trough any more. The new QMB MOTOR STARTER PANELBOARD makes a much cleaner job. It's easier to install, it costs no more, and it's in our distributor's stock. In our business, we're concerned with overall installed costs. We find the installed cost of the QMB STARTER PANELBOARD is no greater than that of separate components. The interlock between the switch and starter doors makes a much safer installation, too.

• Plug-in construction combined with heavy-duty industrial design has made the QMB PANELBOARD a tremendous success. In fact, the flexibility of this unit plus availability from distributor stocks, has made it the leading power panelboard on the market. It's available either in 600 volt or 240 volt construction. Motor control units are available for use with either voltage switch units. When switch units exceed 200 amperes, the panelboards can be obtained from the nearest Square D Assembly Plant, completely factory-assembled. It's the modern fusible standard.

For additional information
write Square D Company, 6060 Rivard Street, Detroit 11, Michigan

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Numerical Control Added, Regular Control Retained

POSITIONING controls for turning, facing, and boring have been applied to the Series EE, Model 1000 lathe made by Monarch Machine Tool Co. A convenient operator console provides numerical control through a modified General Electric Mark II unit. Regular control features are retained and the machine can be adapted to conventional manual operations in seconds.

Data input is from a tape punched on a Flexowriter. A programer sets up the dimension the carriage must move from the zero point, diameter information for cross slide movement, feed rates, spindle speeds, and other functions.

Tape reader information is interpreted in the director cabinet and remains in memory until the right carriage and cross slide positions are obtained. Feedback units signal the director when the positions have been reached. Diameter and length accuracies of +0.001 in. are claimed for the control system.

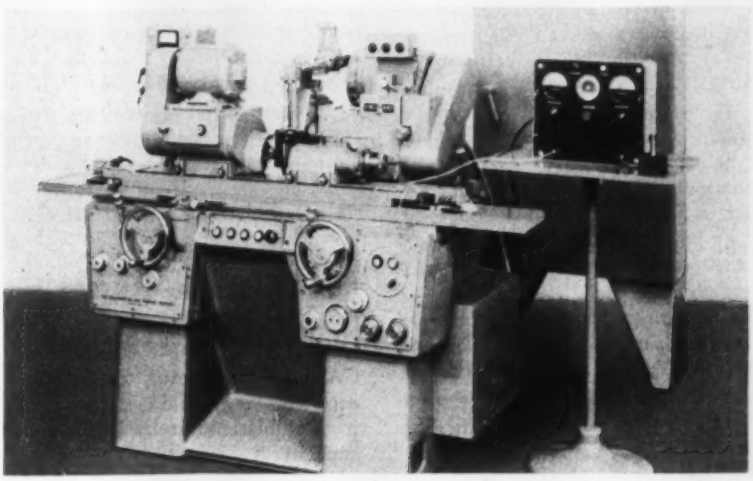
For more information, *write* Monarch Machine Tool Co., Sidney, Ohio.

Grinder, Gaging System Do Precision Mating Work

THIS grinder has an integral gaging system that will grind mating parts, such as missile control valves and fuel injector plungers, to within a few millionths of an inch.

Tolerances are within 0.00001 in. for roundness, 0.00002 in. for straightness, and 0.00025 in. for size. Surface finish tolerances are within 4 microinches.

The gaging system has OD and ID air gage units and a high amplification differential meter. Clearance between the mating parts is set on a dial. Separate master gages are not required for each clearance setting. ID and OD gages are set from masters. Clearance is dialed



in. To grind without mating, the ID gage is inactivated.

For further information, *write* Cincinnati Milling Machine Co., 4701 Marburg Ave., Cincinnati 9, Ohio.

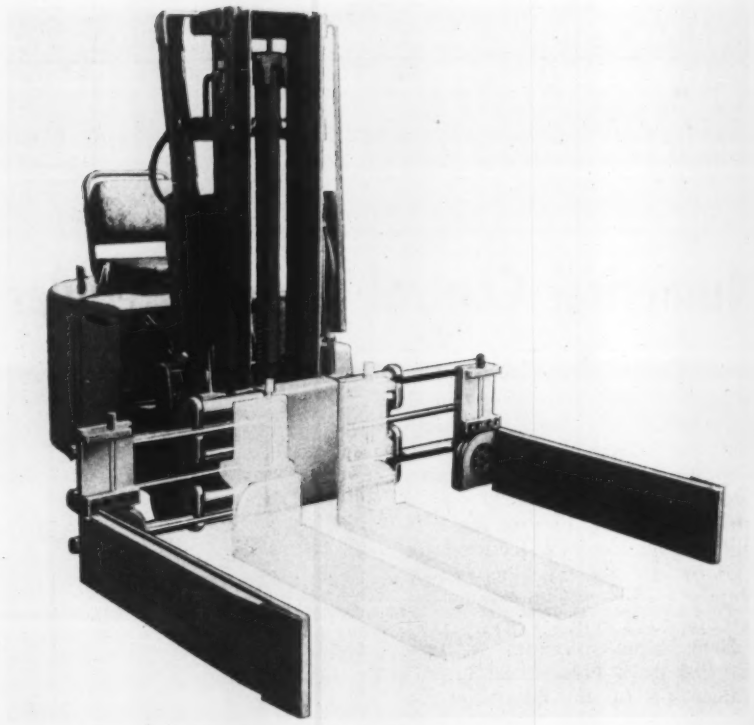
Voltage Control Handles Motors from 1 to 200 hp

THE all static, variable voltage control (Type AVR) is made for motors rated from 1 to 200 hp operating on 50 or 60 cycles. Larger ratings are available. Three phase, 208/220 or 440 volt power can be used.

The unit (called Reactifier Drive) has constant torque over an 8:1 speed range, but you can also get a constant horsepower feed range with motor field control. Magnetic amplifiers, power reactors, and silicon diodes provide low maintenance, long life, and reliability.

The control is suitable for drive functions requiring regulation of speed and tension.

For further information, *write* Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.



SIDE SHIFT LOAD GRAB AND ARMS ON THIS TRUCK can handle unit loads with or without pallets. In the clamping position, they can grip two or four drums, heavy cartons, bales, boxes, crates, kegs, or other types of loads. With the arms in flat position, pallets can be handled. Exact positioning of loads can be obtained with the side shift load grab. For further information **write** Dept. R9-29, Lewis-Shepard Products Inc., 125 Walnut St., Watertown 72, Mass.

V-Belt Drives Have Higher Power Capacity

HIGH strength belts and sheaves (T. B. Wood's Ultra-V) can handle up to three times more horsepower in the same space, says the company.

Shaft overhang is reduced, bearing life increased, and maintenance costs are lowered. On some large drives, outboard bearings are eliminated.

The deep, narrow belts have greater sidewall area. Arched tops confine tensile members and free sidewalls for compression and gripping power. The top also helps hold tension members in alignment and equalizes the load. Matching sheaves have narrower grooves and closer groove spacing. Smaller diameters can be used and lighter units result.

For further information, *write* T. B. Wood's Sons Co., 1200 Fifth Ave., Chambersburg, Pa.

Water Diluted Stripper Wrinkles Epoxy Enamels

WITH Enthone S-28, you can strip synthetic enamels rapidly at room temperature with dilutions as high as 1 part stripper to 20 parts water.

The stripper is nonflammable. It does not contain phenol or phenolic compounds. It wrinkles coatings and ends contamination problems. Solutions can be readily maintained by periodic additions of S-28.

For further information, *write* Enthone Inc., a subsidiary of American Smelting & Refining Co., 440 Elm St., New Haven 8, Conn.

Blast Cleaning Barrel Handles Large Castings

CASTINGS weighing up to 500 lb each can be cleaned in the 15 cu ft Rotoblast barrel. Batch load capacity is 2700 lb.

You can specify standard controls or you can order the semiautomatic or fully automatic type. The unit uses a 30 hp Rotoblast wheel which delivers 50,000 lb of abrasive per hour for rapid cleaning.

Interior construction has alloy steel plates that last up to 100 times longer than mild steel, says the company. The slat type work conveyor resists jamming and runs quietly.

For further information, *write* Pangborn Corp., 10 Pangborn Blvd., Hagerstown, Md.

Vacuum Heat Treating Unit Has Many Uses

THE Ipsen vacuum heat treating furnace can be used for high temperature copper or nickel brazing of stainless steel assemblies. Other uses include: Vacuum annealing, special tool steel hardening, tempering, and heat treatment of refractory metals, reactive metals, stainless

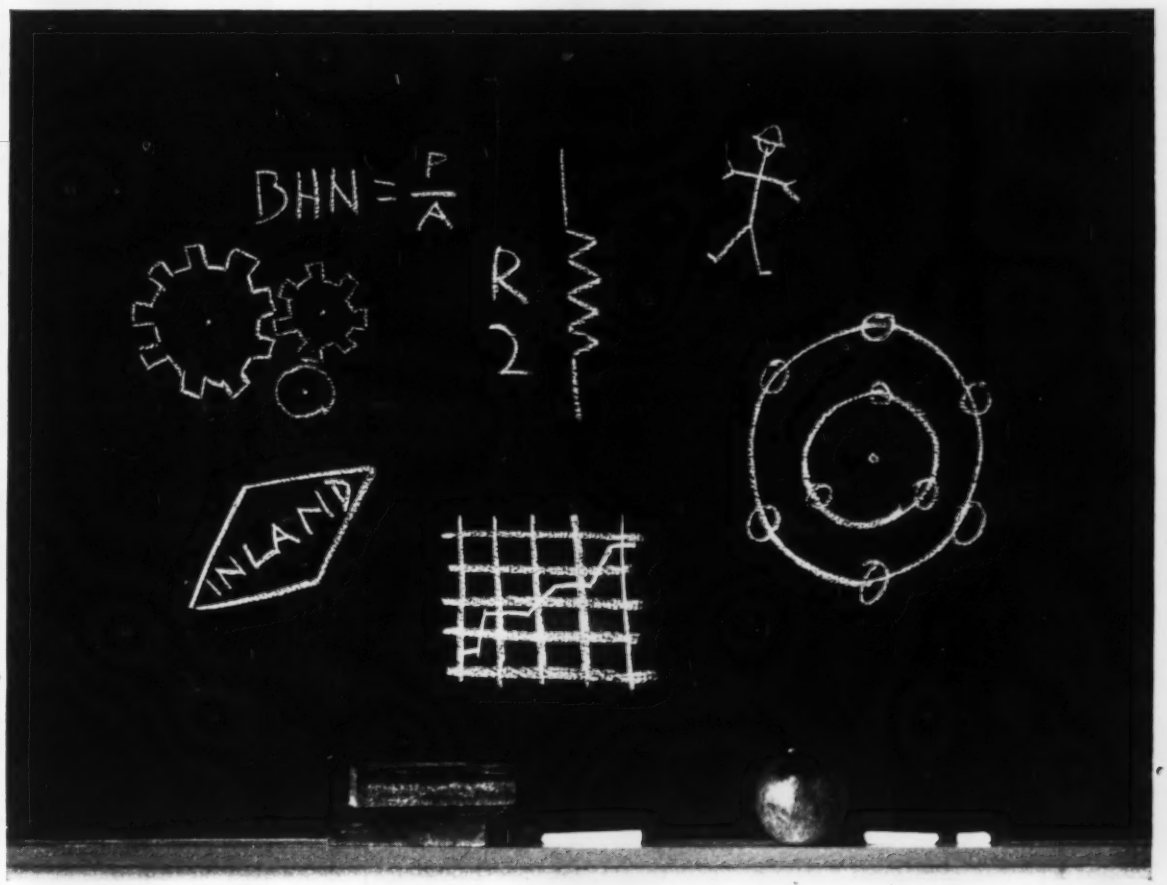
14,089 Inland employees went to school last year

Many went because they were enthusiastic about their jobs—inspired by the advancement opportunities at Inland. Others went because Inland, ever on the watch for men capable of developing their abilities, sought them out—found them—encouraged them to take the next step.

At Inland, this thoughtfully planned system of seeking for such men within the company, has now been in continuous operation for more than fifteen years. Because of it, more than 70% of Inland's supervisory staff have come up from the ranks—30% more from Inland's College Recruitment Program. Because the system encourages personal growth, the process never stops. It may begin with on-the-job training programs in which 3,842 employees participated last year. It can continue through Inland's programs in conjunction with leading educational institutions, such as Harvard, Purdue, University of Chicago and Wabash College.

With literally thousands of Inland men building their own futures, a new kind of climate is created—a climate in which men find real satisfactions in their work and the products of their labor. It results, we believe, in a growth-minded organization—a company dedicated to ever better service and products for every Inland Customer.

Building Today, with an Eye to Tomorrow



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INLAND STEEL PRODUCTS COMPANY
INLAND STEEL CONTAINER COMPANY*
INLAND LIME & STONE COMPANY* *Divisions

steel, and special alloy steels. The machine is automatic but can be set for manual operation.

Work space is 10 in. in diameter and 14 in. deep. Maximum operating pressure is 0.1 micron Hg. Input is 25 kw with a maximum operating temperature of 2500° F.

Low voltage graphite heating elements are used. Six radiation shields confine the heat. Top and bottom shields also act as baffles for forced convection cooling. Safety features include an automatic shut-off and alarm in event of failure.

For further information, *write* Ipsen Industries Inc., 715 S. Main St., Rockford, Ill.

Electric Hoists Available As One, Two Speed Models

THE single and two speed electric hoists added to the Series "600" come in ½ and 1 ton capacities. You can select from standard voltages and a range of lifting speeds and suspensions.

The two speed models provide a slow speed for close spotting plus a high speed for rapid movement of the load before and after spotting. A two speed, high torque, squirrel cage motor is used.

The units have an almost constant hoisting and lowering speed in either slow or high range under load or no load conditions.

For further information, *write* Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore Inc., Muskegon, Mich.

WITH THIS TRUCK MOUNTED UPENDER AND ROTATOR, you can handle coils up to 20,000 lb. Simplified handling is claimed for coils placed flat on pallets or standing upright. The electric lift truck attachment can also transfer coils from one position to the other. Movement is done with a pair of rotating forks, a pivoting ram, and independent side shifting of either ram or forks. Functions are controlled from the truck cowl. For further information, **write** Yale Materials Handling Div., Yale & Towne Mfg. Co., T1000 Roosevelt Blvd., Philadelphia 15, Pa.

Easy-to-Install Ductwork Covers Live Crane Wires

FLEXIBLE neoprene ductwork is used in the Penrose trolley system to enclose exposed trolley crane wires and other live electrical parts on present or new installations. Service is not interrupted during installation on existing equipment.

The wire enclosing duct has a slot through which the trolley shoe passes.

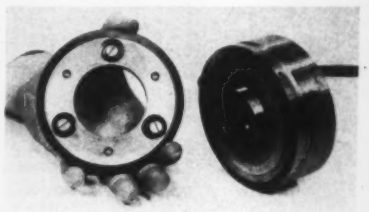
The system is not affected by weather or temperature changes. The shoes keep ice from forming on the conductor and automatically de-ice the safety duct. Maximum speed and high amperage equipment may be used without modification, says the company.

For further information, *write* Industrial Div., Northbrook Products Inc., 230 E. Ohio St., Chicago 11, Ill.

Face Tooth Clutches Have High Torque, No Slip

THIS series of face tooth type clutches is available in five ratings from 30 through 725 lb-ft of torque. Stationary field design is used to reduce maintenance. There are no air gap adjustments or slip rings and brushes to be cleaned, adjusted, or replaced.

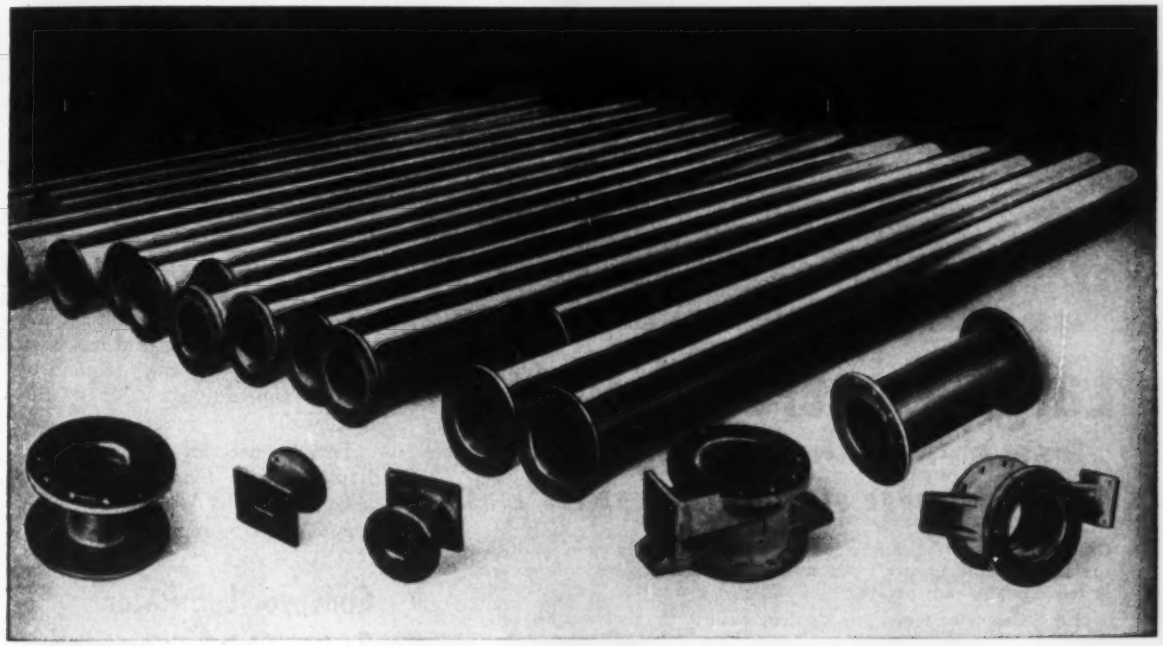
Face tooth design and stationary field construction provide such ad-



HERESITE

REG. U. S. PAT. OFFICE

COATED IRON PIPES AND FITTINGS PROTECT YOUR PRODUCTS



Many industries rely on HERESITE PURE PHENOL-FORMALDEHYDE resin lining in steel pipes and steel pipe fittings to control corrosion and commodity contamination.

Since 1942 the oil industry has used millions of feet of pipe which were lined with HERESITE to reduce corrosion fatigue.

Catalog No. 57 will be mailed if requested on your letterhead.

HERESITE & CHEMICAL COMPANY

MAIN OFFICE & PLANT—MANITOWOC, WISCONSIN

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Canada: Dominion Rubber Company, Ltd.
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Europe: Aluminium-Schweisswerk A. G.
Schlieren-Zurich, Switzerland

Announcing . . .

New Production Capacity

To Serve You Better

Large Generated Gears

SPUR—HERRINGBONE—HELICAL

for a wide range of industrial applications

Gears which must operate smoothly and without vibration at higher speeds and under greater loads must correspondingly be more accurate in tooth profile and spacing.

H & S Generated Gears provide these results.

To meet increasing customer demands, Horsburgh & Scott has broadened its manufacturing capacity and tooled to produce *large* Generated Gears up to 125″ diameter.

Offering the same high quality standards which characterize the complete H & S Gear line, production capacities for large Spur, Helical and Hobbed-Herringbone Gears are now available in the following dimensions:

Up to 80″ outside diameter at 1 DP
Up to 90″ outside diameter at 1¼ DP
Up to 100″ outside diameter at 1½ DP
Up to 125″ outside diameter at 2 DP

Face widths up to 42″, depending on helix angle.

Take advantage of this new capacity, and our long experience as specialists in this field. Send your specifications, drawings or plans — or tell us about your power transmission problem. Our technical staff will promptly consider your requirements and render recommendations and quotations.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue • Cleveland 14, Ohio

vantages as unit design, rapid action, consistent performance, and minimum backlash, says the company. You can get models for 24 or 90 volt, direct current operation.

For further information, *write* I-T-E Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30, Pa.

High Strength Refractory Is Abrasion Resistant

PLASTIC or dry forms of Ramtite's refractory material ("90-RAM") are available. The plastic form is ready to install by ramming. By adding water, the dry form can be easily prepared for placement by ramming, tamping, pouring, troweling, or gunning. The refractory is a 90 per cent alumina, air setting, ramming mix.

Applications include continuous reheat furnace hearths, soaking pit slag lines, burner ports, hot metal mixers, and hot top linings. The abrasion resistant material has high strength after drying (equal to burned superduty brick, says the company).

For further information, *write* Ramtite Co., a division of S. Obermayer Co., 2563 W. 18th St., Chicago 8, Ill.

Conveyor Lubricator Sprays Oil Automatically

YOU can lubricate trolleys and chains automatically. Fauver 110 Series automatic conveyor lubricators are available for that purpose. The design is especially effective for conveyors passing through kilns or ovens that break down lubricants, or where conveyors pass through washers that corrode bearings and link pins.

The 2 gallon, cast aluminum reservoir handles air line pressures up to 125 psi. Trolley wheels passing the lubricator trip a trigger that releases an oil spray into the wheel bearings and on the chain link pins.

For further information, *write* J. N. Fauver Co. Inc., 51 W. Hancock, Detroit 1, Mich.

The Prime Mover Company, manufacturer of materials handling equipment, says:

Our "Prime Movers" give these 6 parts a terrific beating...that's why they're made of LaSalle

Engineers of the Prime Mover Company, Muscatine, Iowa, demanded the most dependable steel bars available for six important parts of their transmission assembly. Here are some of the reasons they specified STRESSPROOF!

You don't have to heat treat STRESSPROOF! There's no heat treat distortion.

STRESSPROOF is strong . . . 100,000 psi.

It machines faster . . . at 83% the speed of B1112.

It wears better without case hardening . . . replacing .40 carbon alloy steels and other heat treated and alloy steels, such as 8640, 4140, C1045, C1141, and C1137.

It costs less than heat treated in-the-bar alloys.

STRESSPROOF®
STEEL BARS

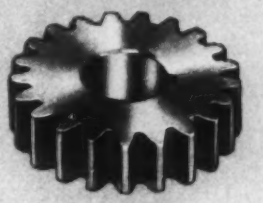
with copper
Strength Without Heat Treating

Worm Shaft, 1½"

Input Shaft, 1 15/32"

Driving Axle, 1 15/32"

Shifting Shaft, ¾"


Reverse Pinion, 3"

Bearing Carrier
Clutch Throwout, 2¼"

Use this coupon to request technical bulletin announcing improvements in LaSalle STRESSPROOF *Steel Bars...with copper.*

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Please send technical bulletin "Today's Improved LaSalle STRESSPROOF Steel Bars...with Copper."

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HEAT AND CORROSION RESISTANT

RETORTS • BASKETS • SCREENS • GRIDS

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Rolock has so many successful pit-type furnace equipment installations . . . so many satisfied repeat customers . . . that we feel very confident in promising you equal satisfaction.

Furthermore, we make ALL the basic equipment needs for pit-type furnaces of every popular size and type . . . retorts, screens, grids, baskets, fixtures, or specially designed work carriers. In each you will find unique ROLOCK design and construction features that are PROVED life-lengtheners . . . performance-improvers . . . long-term cost-reducers.

The best way to gain these benefits is to send us your next order.

* **ROLOCK GUSSET DESIGN: An exclusive ROLOCK feature developed out of years of practical experience. Permits properly controlled and supported seal-rim expansion and contraction . . . greatly extends life of retorts.**

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JOB-ENGINEERED for better work
Easier Operation, Lower Cost

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NEW Literature

Write directly to the company for a copy

Corrosion Chart

A wall chart provides comparative corrosion resistance of zirconium, titanium, tantalum, Hastelloy "C", and stainless 316 tubing to 43 commonly encountered reagents. Damascus Tube Co., Greenville, Pa.

Radiamatic Pyrometers

A radiamatic catalog, C93-1a, discusses the theory and fundamentals of radiation pyrometry as well as the function, construction, and application of radiamatic pyrometers. Minneapolis-Honeywell Regulator Co., Wayne and Windrim Avenues, Philadelphia 44, Pa.

Jobs for Air Work Units

"A Panorama of Production Ideas," 16 pages, gives examples of the ways in which the Bellows air motor and other "controlled-air-power" work units are used to cut costs and increase productivity per machine and manhour. Bellows Co., Akron 9, Ohio.

Bar Specifications

An 8 page folder gives complete sizes, pounds per foot, and alloy specifications for brass, bronze, and nickel-silver rectangular and square bars. Titan Metal Mfg. Co., a subsidiary of Cerro de Pasco Corp., Bellefonte, Pa.

Heat Treatment of Steel

A 28 page booklet describes the derivation and meaning of the TTT diagram and gives fundamental information concerning various heat treating procedures, including step annealing, martempering, and austempering. Uddeholm Co. of America Inc., 155 E. 44th St., New York, N. Y.

Compressed Air Fundamentals

This booklet aids in the selection of small air compressors. It describes how air is compressed, single and two stage compressors, piston displacement, actual delivery, unloading of compressors, regulation, and types of controls used. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

NEW BOOKS

Principles and Techniques of Mechanical Guarding, Bulletin 197, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 58 pages, 40 cents

This U. S. Department of Labor bulletin discusses mechanical guarding and outlines some broad principles applicable to all guarding situations. It will be helpful to safety engineers and inspectors, and to designers of new machines seeking to eliminate or control the hazards inherent in mechanical guarding.

It takes unusual facilities to machine and cut a 22-ft. ring gear weighing 44,000 lbs.

The Farrel generator, on which this gear is being cut, is one of the largest in the world.

This giant, 7-degree, single-helical gear will be used in a cement kiln. Cast of alloy steel, the teeth were precision cut on a Farrel gear generator. Machining consisted of turning, boring, planing and drilling.

Having a 22-foot outside diameter and a face width of 19", it well illustrates Farrel's unique capacity for cutting gears of this type. The company's machining facilities are also unusually complete and fully able to handle any type of work on the largest gears required.

The maximum size of Farrel generated-tooth gears, single helical and spur, is 23 feet diameter, 30 inches face. However, by alternate cutting methods this diameter limit can be greatly exceeded. Continuous-tooth herringbone teeth can be generated up to 23 feet diameter and 60 inches face; also, internal gears can be produced with either single helical or spur teeth, in sizes up to 23 feet external blank diameter, 20 inches face.

Ask for details of large industrial gears to meet your requirements.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

Sales Offices: Ansonia, Buffalo, Akron, Ann Arbor (Mich.), Chicago, Minneapolis, Los Angeles, Salt Lake City, Tulsa, Houston, Atlanta

European Office: Piazza della Republica 32, Milano, Italy

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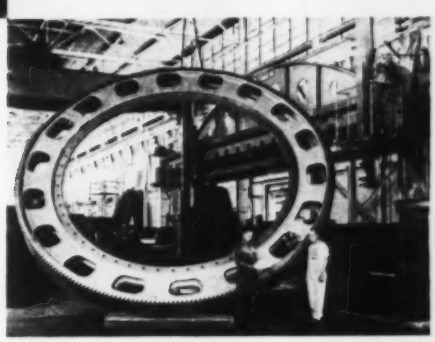
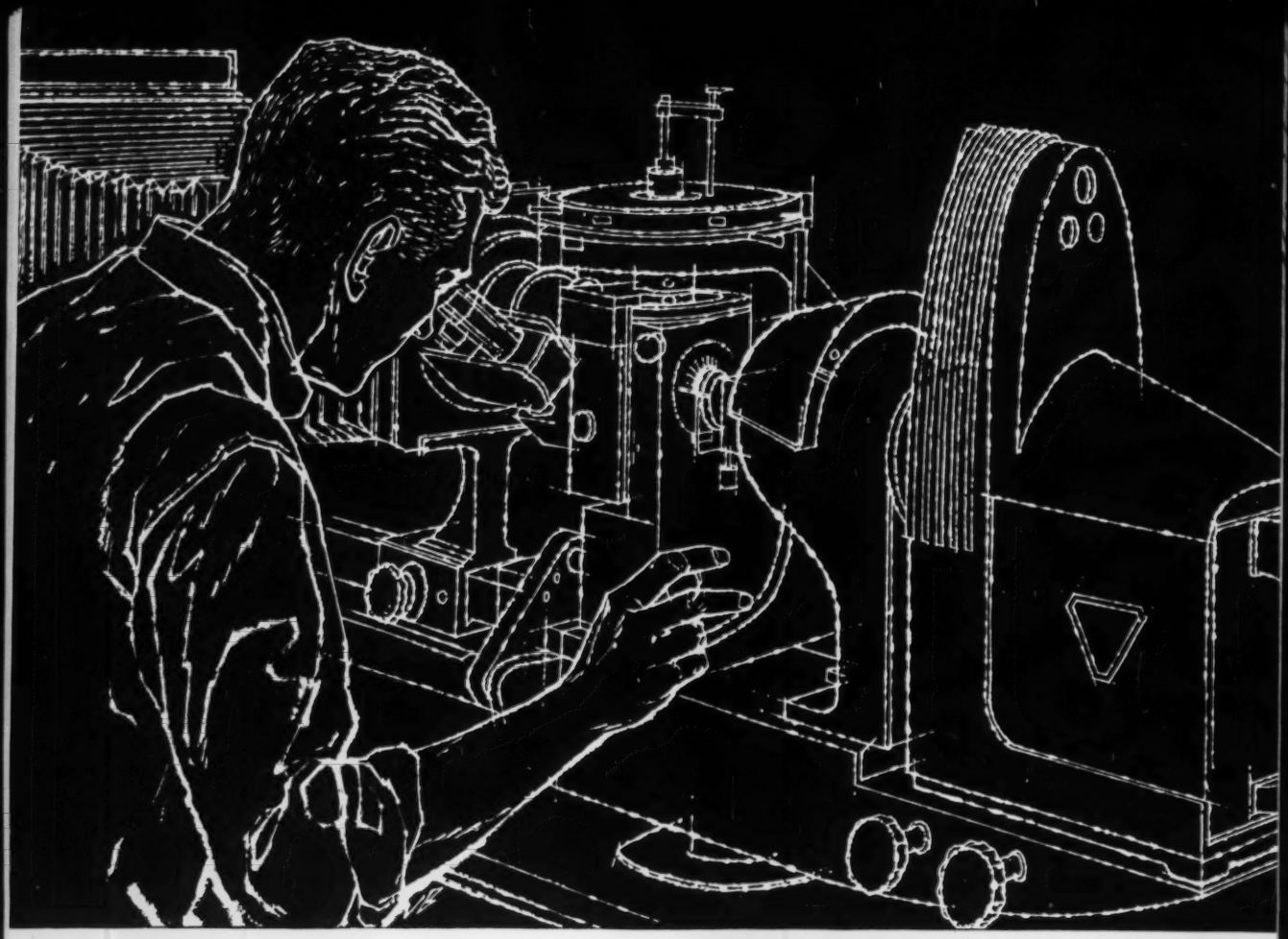
FARREL



Another view of the gear, behind which can be seen a Farrel-Betts 42-ft. vertical boring mill.



PRECISE CONTROL OF MICROSTRUCTURE

to your restricted specifications with

J&L Cold Rolled Strip Steels

The microstructure of strip steels can have an important bearing on the fabrication and mechanical properties of many critical components. All of the phases which combine to form the structure of a metal have their own specific properties.

J&L offers you an experienced organization devoted to strip steel processing combined with fully integrated facilities which permit precise control of microstructures.

Basic oxygen furnaces, high standard open hearth practice and electric furnaces provide optimum melting conditions; new hot strip mills are designed specifically to produce the finishing temperatures needed for inherent quality. Cold mills, annealing and normalizing furnaces and other equipment are designed and constructed solely for precision strip steel processing.

These integrated production facilities make it possible to assure the development of the microstructure required for critical applications.

For your convenience, precision strip facilities are available to you in our plants at Youngstown, Indianapolis, Los Angeles and Kenilworth (N. J.)

The small unit rotary annealing method assures precision temperature control and develops optimum hardness and microstructure for strip steels.

J&L STRIP

LOW CARBON • HIGH CARBON • ALLOY • STAINLESS
TEMPERED SPRING STEEL • ZINC AND COPPER COATED

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Youngstown 1, Ohio

Ship Yesterday, Plead Steel Users

FEARING they'll be shortsupplied when steelmakers distribute their products, consumers are trying hard to get to the front of the line. Big and small, they're converging on the mills, pouring into sales offices with tales of woe and requests for special treatment.

Companies that bought heavily in the first half, then scheduled nothing for delivery until October, are trying to buy third quarter tonnage. Reason: Steelmakers won't get around to October orders until they've shipped all the material that was scheduled for July, August, and September.

Customers of long standing want special consideration because they stayed loyal when their supplier needed business. Customers of no standing ask help because: "You've always wanted a chunk of our business—here's your chance."

To make things really interesting, top automotive executives are coming in from Detroit. Assigned to procurement task forces, they're ready to jump up and down, pound on tables, and deliver ultimatums.

RAPID RECOVERY— In spite of the pressures, steelmakers hope to treat all customers fairly. The faster they can get high level ingot production, the faster they'll be able to process and ship badly needed finished goods. Two encouraging factors were noted soon after operations resumed: 1. Damage to equipment has been relatively light. A leading steelmaker estimates that 85 per cent of its open hearths are in operating condition. Roofs of only 2 per cent have fallen in completely (possibly a testimonial for the durability of today's basic roofs). 2. Steelworkers returned to their jobs with a will, giving lie to reports that they might deliberately slow down. After so many weeks of unemployment, they're anxious to earn as much as they can on incentives. What's more, they're sensitive to industry charges that work rules perpetuate inefficiency.

SURPLUS TUBE CAPACITY— "Once the steel mills get rolling, they can and will produce oil country pipe at a much higher rate than the oil industry plans to use it," says John E. Timberlake, sales vice president of Jones & Laughlin Steel Corp. Producers can expect a regular, organized schedule of shipments from the mills in about 60 days, he adds. Looking ahead to 1965-67, Mr. Timberlake sees no need for additional steel industry capacity for oil country pipe.

ORE STOCKS MAY SUFFICE— Given 30 days of good weather, Chicago steelmakers figure they'll get enough iron ore down the Great Lakes to carry them through the winter. Some hauling will probably be done by rail. Pittsburgh and East Coast mills with well established South American sources are in good shape. Those that depend largely on Mesabi ore call the situation "difficult but not impossible."

ALL OR NOTHING— "Next year will either be one of record demand on a broad front or one of economic stagnation stemming from continued consumer uncertainty," predicts James Rich, U. S. Steel Corp.'s assistant director of commercial research. "It won't be middle of the road." If the labor dispute is settled promptly, he looks for steel production of 130 million ingot tons, consumption of 90 million tons, assembly of 7.5 million American cars, and a 10 per cent increase in appliance sales.

OUTPUT CLIMBS— Last week, steelmaking operations jumped 27 points to 40 per cent of capacity. Production was about 1,133,000 ingot tons.

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*Current prices were published in the Nov. 9 issue and will appear in subsequent issues.

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Leading Markets for Electrical Sheets

(Net tons; all grades)

MARKETS	1958	1956	1954	1952	1950
Elec. Equip.	396,114	683,778	478,913	491,786	582,995
Exports	48,352	75,953	62,882	56,377	49,260
Machinery	7,773	9,238	3,094	5,695	4,806
Appliances	7,631	16,798	17,392	14,140	34,063
Warehouses	3,578	6,374	4,365	11,040	8,455
Domestic Equip.	3,539	6,433	4,006	2,839	5,241
Automotive	2,982	4,215	8,362	9,378	12,440
Ordnance	2,920	106	374	1,256	507
Railroads	2,013	6,535	6,379	11,678	14,264
Contractors' Products	598	2,083	1,644	1,208	1,664
Shipbuilding	233	336	38	22	18
Processing	174	86	1	38	40
Aircraft	162	659	891	1,055	571
Agriculture	46	292	295	51	104
Oil & Gas	38	156	91	142	57
Mining	38	339	124	210	143
Construction	14	....	....	2	45
Totals	476,205	813,381	588,851	606,917	714,673

Data from American Iron & Steel Institute.

Silicon Steel Prospects Bright

Record shipments expected in 1960 as consumers rebuild their strike-depleted stocks. Long term outlook enhanced by rapid expansion of demand in electronics

LOOK FOR record shipments of electrical sheets in 1960. Producers anticipate heavy consumer pressure most of the year as buyers rebuild strike-depleted inventories. Result: Capacity output through the first six months, at least.

Demand prospects hold indefinite promise. The growth potential is encouraging in most areas of consumption: Power generation, electrical devices and appliances, electronics, atomic energy, missiles and aircraft, automation.

• Executives are confident 1960 shipments will top the record 820,096 tons moved in 1953.

That means a substantial increase over tonnage in strike-afflicted 1959. The first seven months' total this year, 440,779 tons, was 80 per cent above the 244,841 tons moved in the like period of recession-troubled 1958. Shipments for all of last year were only 476,205 tons (see table).

No official estimate of the 1959 total movement has been made —only four producers operated during the strike and shipment data have not been issued since July.

Electrical equipment is no better than the lamination steel used in its manufacture. The silicon steels have high electrical resistance and other properties that cut energy losses. From 80 to 90 per cent of shipments normally go to the electrical machinery and equipment industry (83 per cent in 1958). Virtually all cores for transformers, motors, and generators are made of electrical sheets.

The electric utilities are expanding their facilities at great cost. Spending for electrical equipment in the last quarter of this year is at an annual rate of $530 million vs. $440 million in the same period of 1958.

• Electronics business is rising faster than predicted as miniaturization of electrical and electronic controls accelerates.

Sales will total about $9 billion this year. They may hit $10 billion in 1960, possibly $15 billion by 1965. Miniaturization has become a driving force in the economy, as science opens up new worlds for man to conquer in space and time with supersonic flight, missiles, rockets, satellites, television, radio, computers, and automatic devices of all descriptions.

Exports, second to electrical machinery as an outlet, are one marketing area where demand prospects could be better. The outlook is dimmed by competition from foreign producers (England, France,

Belgium, Italy) who have acquired U. S. machinery and production knowhow. Imports of electrical sheets as such are minor, but substantial tonnage is coming into the country in large generating equipment.

It's hard to gage the impact of such machinery imports on electrical steel volume, but steelmen fear serious inroads into their market unless the trend is reversed.

The outlook for home appliances is good. Electrical sheets are used in the fractional horsepower motors that power them. Record appliance sales are indicated this year. Demand for air conditioning equipment, using hermetic motors (intergap units of 300 to 400 hp), has been strong all year long, and the 1960 outlook is excellent.

• In the early days of electrical apparatus, laminations of plain low carbon steels were used for magnetic circuits, and large quantities of such steels are still used for intermittent duty motors.

But the silicon steels, starting about 1900, have grown in favor and their application has broadened steadily. Flat rolled electrical steel is generally comprised of iron with varying amounts of silicon up to 5 per cent, and little more than residual amounts of other elements. Today, strips of electrical steel are produced so thin a stack of 8000 stands no more than 1 in. high. The strips are used in such specialized fields as radar, atomic energy, computers, and vacuum tubes.

Electrical steel is classified by production methods: 1. Hot rolled sheets (pack rolling). 2. Cold reduced (continuous rolling). 3. Grain oriented (cold reduced). Hot and cold classifications are furnished either fully processed (magnetic properties fully developed by the supplier) or semiprocessed (with magnetic properties that can be developed with suitable heat treatment). Grain oriented is a fully processed sheet in which the magnetic properties are fully developed by the producer.

• While the silicon steels dominate their market, that dominance is not wholly unchallenged.

Cold rolled sheets are often used as a substitute in fractional horsepower motors and like applications because of lower cost. "Rolled iron" is competitive in some applications. One authority thinks it may supersede low silicon steel in inexpensive motors, generators, and transformers.

Still another possible competitive threat is in the laboratory stage. It's double oriented silicon. It is said to have good properties in both the rolling and transverse directions. Equipment builders and suppliers are co-operating in investigating this material's possibilities.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 154 & 155

Sheets are moving from the reopened mills, mostly tonnage that had been processed but was unshipped at the time the strike was called last July.

The rapidity with which the mills are getting back into production has caused stepup in shipping schedules, but sheetmakers probably won't be able to ship more than moderate volume for three weeks or so.

Generally, they cannot accept new

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tonnage for shipment under five to six months—six months appears to be the minimum on hot rolled, cold rolled, and galvanized. Supply of hot rolled is expected to be tightest since the bulk of output will likely be diverted to the cold mills.

Consumer pressure for deliveries is mounting, but the mills have indicated they will care for their regular customers pretty much in line with past buying and shipping patterns. In other words, except for defense requirements, no one will get favored treatment in shipping schedules. Nevertheless, it was reported last week that the automotive companies were putting more than ordinary pressure on the mills for preferential treatment in their scheduling.

While the supply situation is still worsening, and more consuming plants are being forced to curtail operations or close down, many consumers can still get along on their present stocks until the end of the year.

Tin Plate . . .

Tin Plate Prices, Page 155

The 80 day cooling off period will probably take canmakers off the hook—at least temporarily. Most of them normally start stockpiling tin plate in early October and continue to June, producing cans for the summer packing season.

Continental Can Co. has been getting tin plate from mills which continued to produce during the strike. In addition, it bought some tonnage from England and Canada at premium prices, but the company was more concerned about supply than cost. It has laid off 1400 workers—3 per cent of its work force—and expects further layoffs. About 450 of those furloughed are in the Chicago and Milwaukee areas.

Canmakers' troubles may not be over even though the mills are resuming operations. American Can Co., Continental Can Co., and National Can Co. will still have to negotiate a new contract with the steelworkers' union. American and Continental signed extensions of their contracts Sept. 30. They expire 30 days after the steel strike ends, or Jan. 1, 1960, whichever comes first. National's contract ex-

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pires 30 days after the other two canmakers sign.

Tubular Goods . . .

Tubular Goods Prices, Page 157

Accumulated tonnage is so heavy on pipe mill books that, except for defense needs, the mills probably won't enter much new tonnage until after the turn of the year. One Pittsburgh mill has shut off new ordering of standard and line pipe until February. Its order books on casing and drill pipe are reported to be closed until January.

In general, the pipe mills are getting into production with less difficulty than had been anticipated. Mill damage appears to have been relatively minor during the long layoff.

July and earlier orders are being given first attention in shipping schedules.

Oil drilling operations continue to fluctuate from week to week. In the week ended Nov. 2, 2072 rotary rigs were operating, Hughes Tool Co. reports. That was 24 less than in the preceding week, but 57 above the number operating in the corresponding week a year ago.

Wire . . .

Wire Prices, Pages 155 & 156

Wire mills are seeking to get shipments to customers as quickly as possible following the resumption of operations. Some mills were able to begin immediate shipping of tonnage that was ready to be moved last July when the strike shut down operations.

It's understood that some producers of manufacturers' grades of wire are booked ahead about three months. In some cases, bookings of merchant grades are reported to extend only about a month.

Steel Importers May Cut Prices as Mills Resume

Relatively large tonnages of foreign steel are being offered in the Southwest. Some items are commanding premium prices. Brokers who bought heavily from the foreign mills are now offering mill size tonnages at the warehouse price level.

But sharp price reductions on imported products are expected after the U. S. mills get back into full production. That could adversely affect domestic mill operations later in the poststrike period.

Imported hot rolled sheets are being quoted at $9.35 per 100 pounds. They were quoted at $6.50 last July (for a complete listing of imported steel prices, see Page 159).

Supply in the Southwest of a wide range of products (including reinforcing bars, merchant bars, standard structural shapes, and most wire items) has diminished, but no acute shortages have developed. Galvanized sheets are short, and are being imported from South Africa.

Imports on the West Coast are estimated at 540,000 tons in the first nine months of this year vs. 230,000 tons in the like 1959 period. Of the total, about 140,000 tons found their way into the San Francisco area, about 275,000 tons went to Los Angeles, and the remainder to other Pacific Coast ports.

The rise in the ratio of imports to exports may have cost as many as 1000 jobs in the California steel industry, says Max D. Howell, exec-

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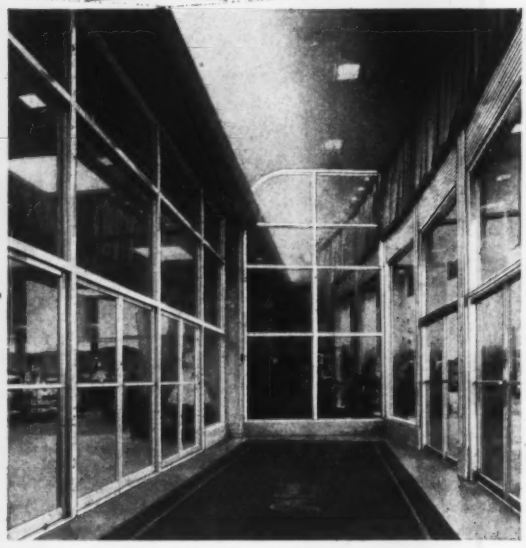

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Washington Steel Corporation

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WASHINGTON, PA.

utive vice president, American Iron & Steel Institute. He recently pointed out that had imports and exports maintained the same balance that prevailed during 1953-57, there would probably have been more than 30,000 additional jobs in the nation's steel industry this year.

Prices on imported steel from Western Europe are generally higher. Exceptions include bar size angles, structural angles, and I-beams, which are off $2 a ton.

Most merchant products are being quoted for January-February shipment, except for sheets which can't be had before March or April.

Canadian Ore Shipments Register Sharp Increase

Canadian mines shipped more iron ore in the first nine months than they did in the same period last year because of the steel strike which suspended ore shipments from U. S. mines into Canada. Comparison: 17,365,965 tons vs. 11,613,789 tons.

Exports of ore from Canada increased to 14,558,179 tons from the 10,220,388 tons reported in the first nine months of last year. Deliveries to Canadian consumers advanced to 2,807,786 tons from 1,393,401 last year.

There are indications Canadian steelmakers may swing away from U. S. ores to Canadian ores.

Steel Bars . . .

Bar Prices, Page 153

The speed at which the mills are swinging back into production is encouraging bar consumers who had tonnage placed on mill books months ago.

Indications are July and earlier bookings will be shipped promptly; tonnage booked for later delivery will generally follow the order of acceptance.

Some bar sellers say their books are filled for at least four to five months, assuming no further labor disruptions. In hot alloys, some producers can promise three to four month delivery.

The situation in cold drawn bars will be considerably eased by the resumption of captive shops which have been closed since last July. Most of the shops have well balanced inventories in terms of sizes and types of bars.

Distributors . . .

Prices, Page 158

A mixed situation exists at steel service centers. Those reopened as a result of the Supreme Court ruling have fairly well rounded out stocks. They will be allotted carefully, mainly to regular customers, because they are inadequate to meet fully the pentup demand.

Distributors who operated during the strike find their stocks badly depleted. They will be unable to replenish supplies to any great extent until mills have been operating several weeks.

Although consumers won't receive fresh shipments of steel immediately, permitting them to make any quick readjustments in their production schedules, they can at least begin to figure when they can do so. Some steel service operators believe a tight supply situation will last at least through the first half of 1960.

Distributors in the Southwest are in fairly good shape. The drain on their supplies has not been as

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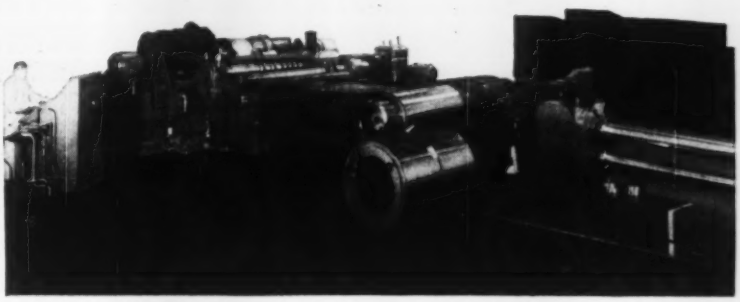

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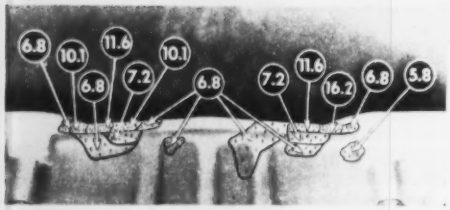

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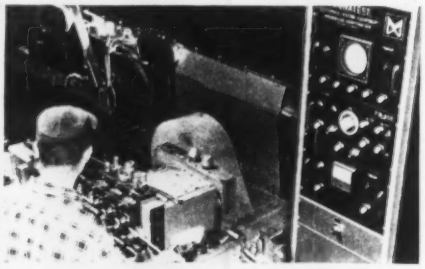

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heavy as in other sections of the country due to the large tonnages supplied by importers.

Plates . . .

Plate Prices, Page 153

With fabricating shops badly in need of tonnage, platemakers are being deluged with inquiries from consumers who want to know when and what they may expect in the way of early shipments. Most producers are being cautious.

Generally, it's estimated that plate mills recently strikebound will not be shipping in volume for three to four weeks. Deliveries against new orders appear to be about four months away.

Because of the shortage of plates, many jobs are being held up.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 154

Distributors and fabricators hold relatively heavy reinforcing steel bar order backlogs. Those with the largest bookings may have to depend on imported bars to some extent to fill their commitments—at least until the domestic mills get back into full production.

Some building projects are being redesigned for concrete construction because of the shortage of structural steel, but estimating on new work is off.

Heaviest buying of the year was in the third quarter, but there was no noticeable firming up of prices.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 159

Production of coke (oven and beehive) in September totaled 1,563,711 net tons, reports the U. S. Bureau of Mines. Of the total, 1,532,010 tons were oven coke, 31,701 tons beehive. Output in the preceding month was 1,582,800 tons (1,542,545 oven, 40,245 beehive). In September, 1958, it was 4,514,800 tons (4,458,100 oven, 56,700 beehive).

In the calendar year 1959 through September, production amounted to 41,704,109 tons (40,857,364 oven, 846,745 beehive). Output in the like period of 1958 was 37,709,300 tons (37,332,100 oven, 377,200 beehive).

Stocks of oven coke held by producers at the end of September

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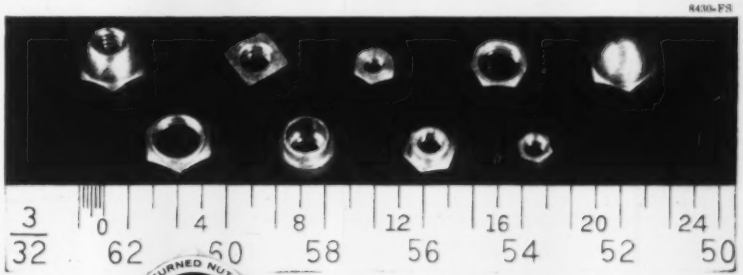

This enlarged scale photograph illustrates typical miniature nuts being supplied for electrical and electronic products.

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amounted to 2,850,429 tons, equal to 55.8 days' production. On the same date a year ago, the total was 3,993,444 tons, equal to 26.9 days' production.

Structural Shapes . . .

Structural Shape Prices, Page 153

Because steel is short, close to 250 federal highway and bridge projects have been delayed or otherwise disrupted. Contracts worth $300 million are involved. Nearly one-fourth of the projects are at a standstill, and before fabricated structurals are again available in normal volume, scores of other public projects will grind to a halt.

Among projects affected: The lower deck of the George Washington Bridge and the Throgs Neck Bridge, New York; $79 million radio telescope, Navy, Sugar Grove, W. Va.; Arnold Engineering Development Center, wind tunnel, $21.5 million, Tullahoma, Tenn.; U. S. Air Force aeronautical testing facilities.

Some of the jobs are high on the defense priority list, but the Corps of Engineers does not expect additional steel for 45 to 60 days.

Structural demand is spotty, but fabricators are pushing for plain material for future as well as early delivery. About the best that can be done on new orders for shapes is 10 to 12 weeks on standard sections and 18 to 20 weeks on wide flange beams.

Most independent fabricators think they won't get back to normal operation until well after the turn of the year. But some captive shops will be able to get into full swing shortly. At the time they were struck last summer, they had good steel inventories.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3250 tons, United Engineering Center, United Nations Plaza, New York, through the Turner Construction Co. to the Dreier Structural Steel Co., Long Island City, N. Y.

2300 tons, 1480 Welton Bldg., Denver, for Public Service Co., to Burkhardt Steel Co., Denver.

1500 tons, Lehigh Portland Cement Co., plant building, Mitchell, Ind., to International Steel Co., Evansville, Ind., and Bethlehem Contracting Co., Bethlehem, Pa. (split order); Fruin-Conlon Contracting Co., Indianapolis, general contractor; reinforcing bar requirements also divided between Laclede, Ryerson, and Truscon.

1365 tons, state highway bridges, Danbury-Bethel-Brookfield-Newton, Conn., to City Iron Works, Wethersfield, Conn.; Frouge Construction Co. Inc., Bridgeport, Conn., general contractor.

1350 tons, building addition, Steering Gear Div., General Motors Corp., Saginaw, Mich., to R. C. Mahon Co., Detroit.

500 tons, laboratory and office building, Argonne National Laboratory, Lemont, Ill., to Vierling Steel Works, Chicago.

420 tons, bridge in Winnebago County, Illinois, to Vierling Steel Works, Chicago.

250 tons, Union Ave. bridge, Portland, Oreg., state project, reported to Gunderson Bros. Engineering Co., Portland; C. J. Montag & Sons, Portland, general contractor at $360,466.

250 tons or more, Corbett Ave. freeway, Portland, Oreg., state project, to unstated fabricator; Kuckenberg Construction Co., Portland, general contractor at $315,595.

250 tons, two steel beam bridges, Northfield, N. H., to West End Iron Works, Cambridge, Mass.; J. F. Fitzgerald Construction Co., Canton, Mass., general contractor.

170 tons, food and service buildings, University of Illinois, Champaign, Ill., to Mississippi Valley Structural Steel Co.; Kuhne-Simmons Co., Champaign, general contractor.

160 tons, warehouse, Richards-Wilcox Co., Aurora, Ill., to Vierling Steel Works, Chicago.

105 tons, bridge in Effingham County, Illinois, to Vierling Steel Works, Chicago.

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3750 tons, 14th St. Bridge, over the Potomac River, Washington, D. C., Blout Bros., Montgomery, Ala., low on the general contract.

1800 tons, two hangars, Andrews Air Force Base, Maryland, Benneri Construction Co., Westfield, N. J., low on the general contract.

700 tons, also 100 tons of reinforcing bars, Idaho underpass, Washington County; Morrison-Knudsen Co. Inc., Boise, Idaho, low at $638,177.

650 tons, Willamette River bridge and railroad overcrossing, Lane County, Oregon; Peter Kiewit Sons Co., Vancouver, Wash., low at $2,128,295.

275 tons, high tensile, General Stores Supply Office, Navy, Philadelphia; bids Nov. 23; also 65 tons, high tensile, bar flats, and 55 tons, grade M, structural steel.

REINFORCING BARS . . .

REINFORCING BARS PLACED

790 tons, state highway structures, Danbury-Bethel-Brookfield-Newton, Conn., to Capitol Steel Corp., New York; Frouge Construction Co. Inc., Bridgeport, Conn., general contractor.

760 tons, food, housing, and service buildings, University of Illinois, Champaign, Ill., to Laclede Steel Co., St. Louis; Kuhne-Simmons Co., Champaign, general contractor.

460 tons, post office and courthouse, Ft. Dodge, Iowa, to Laclede Steel Co., St. Louis; Sam Patti Construction Co., Kansas City, Mo., general contractor; Southwest Ornamental Iron Co., Kansas City, 50 tons of structural steel.

190 tons, two four-span composite wide flange beam bridges, Putney, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; Perini Corp., Framingham, Mass., general contractor.

175 tons, buildings, Mary Washington Hospital, Fredericksburg, Va., to Houck-Green Steel Co., Richmond, Va.; J. Kennon Perrin Co., Richmond, general contractor; fabricated structural steel to Montague-Betts Co., Richmond.

100 tons, two highway bridges, Northfield, N. H., to Bancroft & Martin Rolling Mills Co., South Portland, Maine; J. F. Fitzgerald Construction Co., Canton, Mass., general contractor.

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100 tons or more, six story Hadley Apartments, Seattle; Lagerquist Bros., Seattle, general contractor.

100 tons, gymnasium, West Seattle High School; general contract to George E. Teufel, Seattle, low at $398,977.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

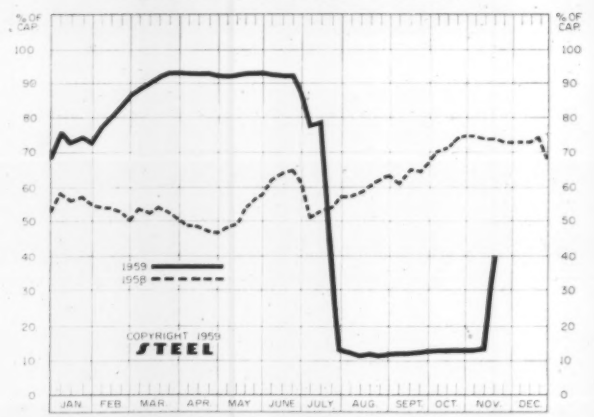
	Week Ended Nov. 15	Change	Same Week 1958	Same Week 1957
Pittsburgh	42.5	+40.5	70	79
Chicago	43	+37.5	86	80
Eastern	32	+19	72	83
Youngstown	32.5	+23.5	62	66
Wheeling	70.5	+13	84.5	69
Cleveland	45.5	+39.5	69	81
Buffalo	85	+81	78	85.5
Birmingham	15	+ 6	56.5	60.5
Cincinnati	78	+12.5*	86	81.5
St. Louis	65	+ 4	98.5	89.5
Detroit	46.5	+22*	96.5	95.5
Western	28	+10	78	86
National Rate	40	+27*	75.5	77.5

INGOT PRODUCTION

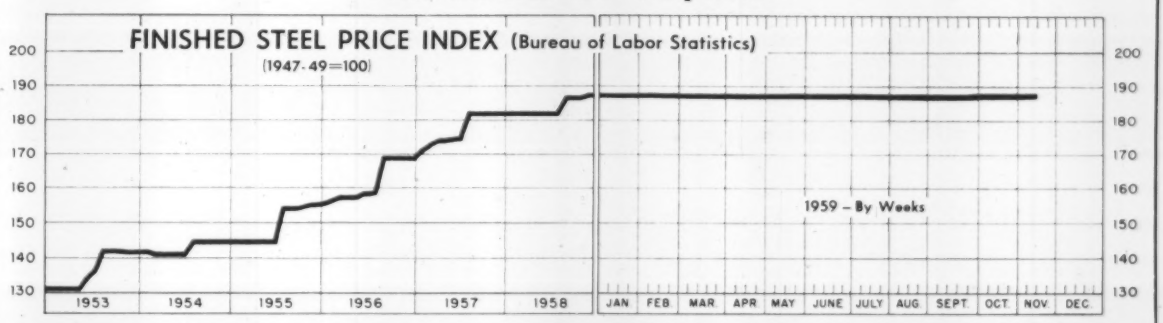
	Week Ended Nov. 15	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	70.5†	22.9	22.9	125.2
NET TONS (In thousands)	1,133†	368	368	2,011

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Nov. 10, 1959	Week Ago	Month Ago	Oct. Index	Year Ago
186.8	**186.8**	**186.8**	**186.8**	**186.9**

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.735
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.420
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	27.005	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.742
		Woven Wire Fence (20-rod roll)	21.765

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.95
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	45.33	45.33	44.33	42.33	33.67

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld. Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Nov. 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	50.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld.,Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$45.50	$45.50	$44.50	$44.50	$34.50
No. 1 Heavy Melt, E. Pa.	45.00	45.00	45.00	40.00	33.50
No. 1 Heavy Melt, Chicago	45.50	45.50	43.50	42.50	33.00
No. 1 Heavy Melt, Valley	44.50	44.50	44.50	43.50	35.50
No. 1 Heavy Melt, Cleve.	41.50	41.50	41.50	40.00	33.50
No. 1 Heavy Melt, Buffalo	33.50	33.50	33.50	35.50	31.50
Rails, Rerolling, Chicago	64.50	64.50	64.50	62.00	54.50
No. 1 Cast, Chicago	57.50	57.50	57.50	45.50	39.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

amounted to 2,850,429 tons, equal to 55.8 days' production. On the same date a year ago, the total was 3,993,444 tons, equal to 26.9 days' production.

Structural Shapes . . .

Structural Shape Prices, Page 153

Because steel is short, close to 250 federal highway and bridge projects have been delayed or otherwise disrupted. Contracts worth $300 million are involved. Nearly one-fourth of the projects are at a standstill, and before fabricated structurals are again available in normal volume, scores of other public projects will grind to a halt.

Among projects affected: The lower deck of the George Washington Bridge and the Throgs Neck Bridge, New York; $79 million radio telescope, Navy, Sugar Grove, W. Va.; Arnold Engineering Development Center, wind tunnel, $21.5 million, Tullahoma, Tenn.; U. S. Air Force aeronautical testing facilities.

Some of the jobs are high on the defense priority list, but the Corps of Engineers does not expect additional steel for 45 to 60 days.

Structural demand is spotty, but fabricators are pushing for plain material for future as well as early delivery. About the best that can be done on new orders for shapes is 10 to 12 weeks on standard sections and 18 to 20 weeks on wide flange beams.

Most independent fabricators think they won't get back to normal operation until well after the turn of the year. But some captive shops will be able to get into full swing shortly. At the time they were struck last summer, they had good steel inventories.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3250 tons, United Engineering Center, United Nations Plaza, New York, through the Turner Construction Co. to the Dreier Structural Steel Co., Long Island City, N. Y.

2300 tons, 1480 Welton Bldg., Denver, for Public Service Co., to Burkhardt Steel Co., Denver.

1500 tons, Lehigh Portland Cement Co., plant building, Mitchell, Ind., to International Steel Co., Evansville, Ind., and Bethlehem Contracting Co., Bethlehem, Pa. (split order); Fruin-Conlon Contracting Co., Indianapolis, general contractor; reinforcing bar requirements also divided between Laclede, Ryerson, and Truscon.

1365 tons, state highway bridges, Danbury-Bethel-Brookfield-Newton, Conn., to City Iron Works, Wethersfield, Conn.; Frouge Construction Co. Inc., Bridgeport, Conn., general contractor.

1350 tons, building addition, Steering Gear Div., General Motors Corp., Saginaw, Mich., to R. C. Mahon Co., Detroit.

500 tons, laboratory and office building, Argonne National Laboratory, Lemont, Ill., to Vierling Steel Works, Chicago.

420 tons, bridge in Winnebago County, Illinois, to Vierling Steel Works, Chicago.

250 tons, Union Ave. bridge, Portland, Oreg., state project, reported to Gunderson Bros. Engineering Co., Portland; C. J. Montag & Sons, Portland, general contractor at $360,466.

250 tons or more, Corbett Ave. freeway, Portland, Oreg., state project, to unstated fabricator; Kuckenberg Construction Co., Portland, general contractor at $315,595.

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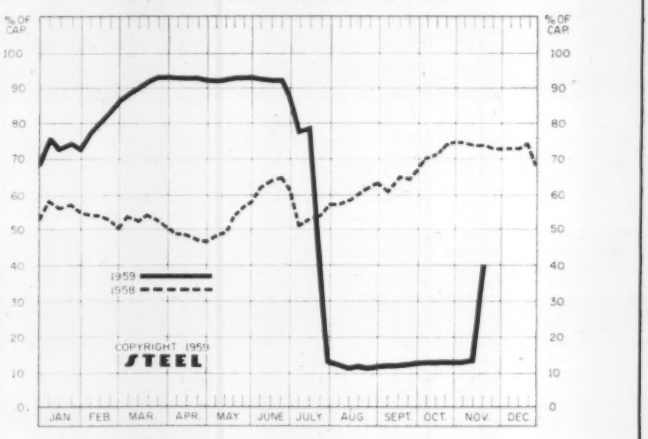
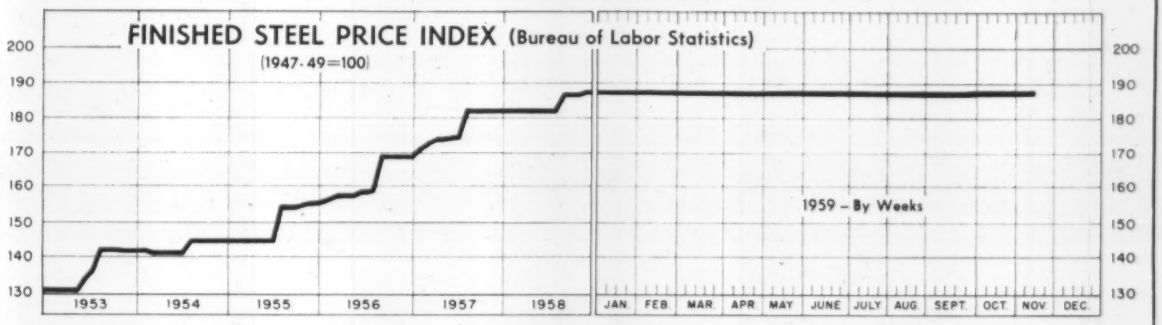


Price Indexes and Composites



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Shapes, deld. Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	4.675

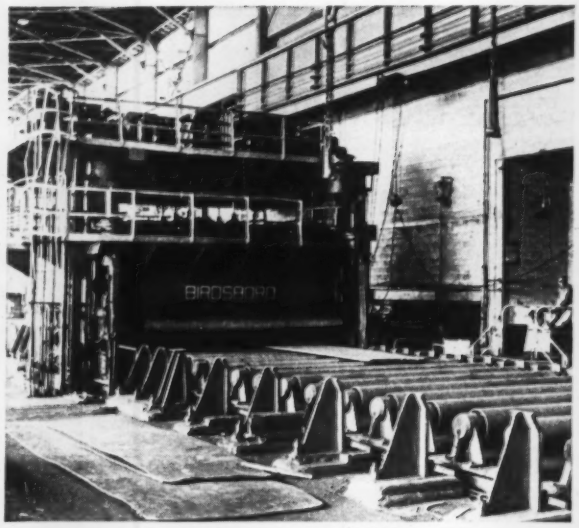
PIG IRON, Gross Ton	Nov. 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	50.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld.,Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

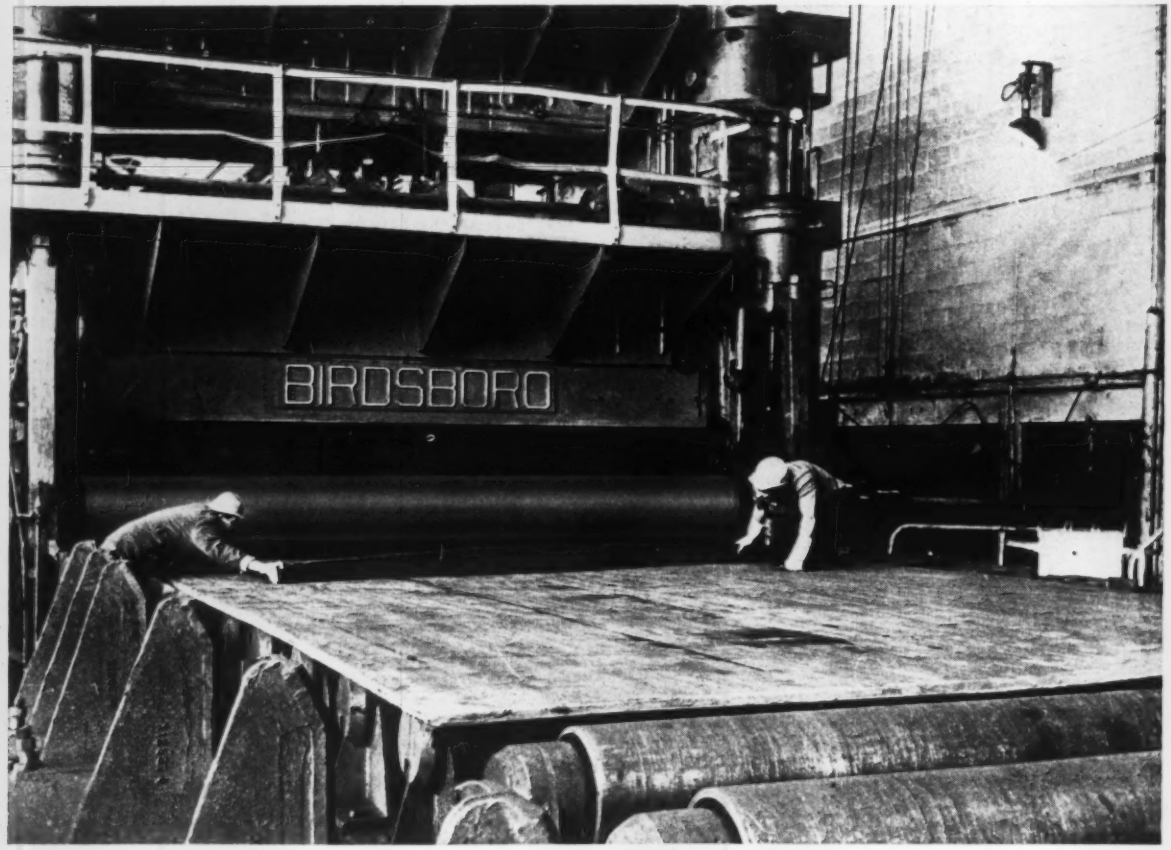
SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$45.50	$45.50	$44.50	$44.50	$34.50
No. 1 Heavy Melt, E. Pa.	45.00	45.00	45.00	40.00	33.50
No. 1 Heavy Melt, Chicago	45.50	45.50	43.50	42.50	33.00
No. 1 Heavy Melt, Valley	44.50	44.50	44.50	43.50	35.50
No. 1 Heavy Melt, Cleve.	41.50	41.50	41.50	40.00	33.50
No. 1 Heavy Melt, Buffalo	33.50	33.50	33.50	35.50	31.50
Rails, Rerolling, Chicago	64.50	64.50	64.50	62.00	54.50
No. 1 Cast, Chicago	57.50	57.50	57.50	45.50	39.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

Lukens Steel meets demand for "dead flat" plate with new **BIRDSBORO** *leveler*



• More and more steel plate orders now require closer tolerances than ever before. To meet this need at Lukens Steel, two roll plate levelers, including the 200" unit pictured here, have resulted in substantial increases in production. Both units were designed and built by BIRDSBORO and turn out "dead flats" under remote control by a single operator and helper. Your BIRDSBORO representative can give you full particulars on any similar unit. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.



MM-76-5X

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

Steel Prices

Mill prices as reported to STEEL, Nov. 11, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, Page 154; footnotes, page 156.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ..$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ..80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ...109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32 ..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ...140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 ..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
Indiana Harbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14 ..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
Indiana Harbor,Ind. I-2 ..5.50
Lackawana,N.Y. B2 ....5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1.8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14 ..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1 5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14 ..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14 ..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa. (9) J5 ..5.675
Alton, Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa. (9) U5 ..5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich. (9) G5 ..5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ..5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1 5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle A24, B3, N14 ..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 ..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ..5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11.6.375
Warren,O. C17 ....6.052
Youngstown(9) R2, U5 ..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.275
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14 8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9)S5 ..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ..5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.52
Seattle B3 ....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2 9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ....9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2 ....9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 ....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ....11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ....9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. R2, W14 .5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 .5.575
ChicagoHts.(4)(44) I-2 .5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.575
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron (Commercial Quality)

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.06

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 .6.275
Aliquippa,Pa. J5 ....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 .6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ..6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2.6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel ofN.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copprweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	....5.10
Allenport,Pa. P7	.....5.10
Alton,Ill. L1	.....5.30
Ashland,Ky.(8) A10	.....5.10
Atlanta A11	.....5.10
Bessemer,Ala. T2	.....5.10
Birmingham C15	.....5.10
Buffalo(27) R2	.....5.10
Conshohocken,Pa. A3	...5.15
Detroit M1	.....5.10
Ecorse,Mich. G5	.....5.10
Fairfield,Ala. T2	.....5.10
Farrell,Pa. S3	.....5.10
Fontana,Calif. K1	....5.825
Gary,Ind. U5	.....5.10
Ind.Harbor,Ind. I-2, Y1	..5.10
Johnstown,Pa.(25) B2	..5.10
Lackaw'na,N.Y.(25) B2	.5.10
LosAngeles(25) B3	.....5.85
LosAngeles C1	.....8.60
Minnequa,Colo. C10	....6.20
Riverdale,Ill. A1	.....5.10
SanFrancisco S7	.....6.60
Seattle(25) B3	.....6.10
Seattle N14	.....6.60
Sharon,Pa. S3	.....5.10
S.Chicago,Ill. W14	.....5.10
S.SanFrancisco(25) B3	..5.85
SparrowsPoint,Md. B2	..5.10
Torrance,Calif. C11	....5.85
Warren,O. R2	.....5.10
Weirton,W.Va. W6	....5.10
Youngstown U5	.....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	.....8.40
Farrell,Pa. S3	.....8.40
Gary,Ind. U5	.....8.40
Houston S5	.....8.65
Ind.Harbor,Ind. Y1	....8.40
KansasCity,Mo. S5	.....8.65
LosAngeles B3	.....9.60
Lowellville,O. S3	.....8.40
Newport,Ky. A2	.....8.40
Sharon,Pa. A2, S3	.....8.40
S.Chicago,Ill. W14	.....8.40
Youngstown U5, Y1	....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	.....7.575
Bessemer,Ala. T2	.....7.575
Conshohocken,Pa. A3	..7.575
Ecorse,Mich. G5	.....7.575
Fairfield,Ala. T2	.....7.575
Farrell,Pa. S3	.....7.575
Gary,Ind. U5	.....7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	..7.575
LosAngeles(25) B3	....8.325
Seattle(25) B3	.....8.575
Sharon,Pa. S3	.....7.575
S.Chicago,Ill. W14	....7.575
S.SanFrancisco(25) B3	.8.325
SparrowsPoint,Md. B2	..7.575
Warren,O. R2	.....7.575
Weirton,W.Va. W6	....7.575
Youngstown U5, Y1	...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	...5.35
Warren,O. R2	.....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	.....7.425
Baltimore T6	.....7.425
Boston T6	.....7.975
Buffalo S40	.....7.425
Cleveland A7, J5	.....7.425
Dearborn,Mich. S3	....7.425
Detroit D2, M1, P20	...7.425
Dover,O. G6	.....7.425
Evanston,Ill. M22	.....7.525
Farrell,Pa. S3	.....7.425
Follansbee,W.Va. W10	.7.425
Fontana,Calif. K1	.....9.20
FranklinPark,Ill. T6	..7.525
Ind.Harbor,Ind. Y1	...7.425
Indianapolis S41	.....7.575
LosAngeles C1, S41	....9.30
McKeesport,Pa. E10	...7.525
NewBedford,Mass. R10	.7.875
NewBritain,Conn. S15	..7.875
NewCastle,Pa. B4, E5	..7.425
NewHaven,Conn. D2	..7.875
NewKensington,Pa. A6	.7.425
Pawtucket,R.I. R3	....7.975
Pawtucket,R.I. N8	....7.975
Philadelphia P24	.....7.875
Pittsburgh J5	.....7.425
Riverdale,Ill. A1	.....7.525
Rome,N.Y.(32) R6	....7.425
Sharon,Pa. S3	.....7.425
Trenton,N.J.(31) R5	...8.875
Wallingford,Conn. W2	..7.875
Warren,O. R2, T5	.....7.425
Worcester,Mass. A7	....7.975

STRIP, Cold-Rolled Alloy

Boston T6	.....15.90
Carnegie,Pa. S18	.....15.55
Cleveland A7	.....15.55
Dover,O. G6	.....15.55
Farrell,Pa. S3	.....15.55
FranklinPark,Ill. T6	..15.55
Harrison,N.J. S18	....15.55
Indianapolis S41	.....15.70
LosAngeles S41	.....17.75
Lowellville,O. S3	.....15.55
Pawtucket,R.I. N8	....15.90
Riverdale,Ill. A1	.....15.55
Sharon,Pa. S3	.....15.55
Worcester,Mass. A7	...15.85
Youngstown S41	.....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	.....10.80
Dearborn,Mich. S3	....10.80
Dover,O. G6	.....10.80
Farrell,Pa. S3	.....10.80
Ind.Harbor,Ind. Y1	...10.80
Sharon,Pa. S3	.....10.80
Warren,O. R2	.....10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET Dollars per 100 lb			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	.....7.85
Gary,Ind. U5	.....7.85
GraniteCity,Ill. G4	....7.95
Ind.Harbor,Ind. Y1	....7.85
Irvin,Pa. U5	.....7.85
Yorkville,O. W10	.....7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	.....$10.05
Irvin,Pa. U5	.....10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	..8.00
Aliquippa,Pa. J5	.....8.00
Alton,Ill. L1	.....8.20
Atlanta A1	.....8.00
Bartonville,Ill. K4	....8.10
Buffalo W12	.....8.00
Chicago W13	.....8.00
Cleveland A7, C20	....8.00
Crawfordsville,Ind. M8	..8.10
Donora,Pa. A7	.....8.00
Duluth A7	.....8.00
Fairfield,Ala. T2	.....8.00
Fostoria,O.(24) S1	....8.10
Houston S5	.....8.25
Jacksonville,Fla. M8	...8.35
Johnstown,Pa. B2	.....8.00
Joliet,Ill. A7	.....8.00
KansasCity,Mo. S5	.....8.25
Kokomo,Ind. C16	.....8.10
LosAngeles B3	.....8.95
Minnequa,Colo. C10	....8.25
Monessen,Pa. P7, P16	..8.00
Palmer,Mass. W12	....8.30
Pittsburg,Calif. C11	...8.95
Portsmouth,O. P12	.....8.00
Rankin,Pa. A7	.....8.00
S.Chicago,Ill. R2	.....8.00
S.SanFrancisco C10	...8.95
SparrowsPoint,Md. B2	..8.10
Sterling,Ill.(1) N15	....8.00
Sterling,Ill. N15	.....8.10
Struthers,O. Y1	.....8.00
Waukegan,Ill. A7	.....8.00
Worcester,Mass. A7	....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	.....8.00

Wire, Gal'd., for ACSR

Bartonville,Ill. K4	....12.65
Buffalo W12	.....13.40
Cleveland A7	.....12.65
Donora,Pa. A7	.....12.65
Duluth A7	.....12.65
Johnstown,Pa. B2	.....13.40
KansasCity,Mo. U3	...12.90
Minnequa,Colo. C10	..12.775
Monessen,Pa. P7, P16	.12.65
Muncie,Ind. I-7	.....13.60
NewHaven,Conn. A7	..12.95
Palmer,Mass. W12	....13.70
Pittsburg,Calif. C11	...13.45
Portsmouth,O. P12	....12.65
Roebling,N.J. R5	.....12.95
SparrowsPt.,Md. B2	..13.50
Struthers,O. Y1	.....13.40
Trenton,N.J. A7	.....12.95
Waukegan,Ill. A7	....12.65
Worcester,Mass. A7	...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	.....9.75
Alton,Ill. L1	.....9.95
Buffalo W12	.....9.75
Cleveland A7	.....9.75
Donora,Pa. A7	.....9.75
Duluth A7	.....9.75
Johnstown,Pa. B2	.....9.75
KansasCity,Mo. S5, U3	.10.00
LosAngeles B3	.....10.70
Minnequa,Colo. C10	....9.95
Monessen,Pa. P7, P16	..9.75
NewHaven,Conn. A7	..10.05
Palmer,Mass. W12	....10.05
Pittsburg,Calif. C11	...10.70
Portsmouth,O. P12	.....9.75
Roebling,N.J. R5	.....10.05
S.Chicago,Ill. R2	.....9.75
S.SanFrancisco C10	...10.70
SparrowsPt.,Md. B2	...9.85
Struthers,O. Y1	.....9.75
Trenton,N.J. A7	.....10.05
Waukegan,Ill. A7	.....9.75
Worcester,Mass. A7	...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	.....9.75
Alton,Ill. L1	.....9.95
Bartonville,Ill. K4	.....9.85
Buffalo W12	.....9.75
Cleveland A7	.....9.75
Donora,Pa. A7	.....9.75
Duluth A7	.....9.75
Fostoria,O. S1	.....9.80
Johnstown,Pa. B2	....9.75
KansasCity,Mo. S5, U3	.10.00
LosAngeles B3	.....10.70
Milbury,Mass.(12) N6	..10.05
Minnequa,Colo. C10	....9.95
Monessen,Pa. P7, P16	..9.75
Muncie,Ind. I-7	.....9.95
Palmer,Mass. W12	....10.05
Pittsburg,Calif. C11	...10.70
Portsmouth,O. P12	.....9.75
Roebling,N.J. R5	.....10.05
S.Chicago,Ill. R2	.....9.75
S.SanFrancisco C10	...10.70
SparrowsPt.,Md. B2	...9.85
Struthers,O. Y1	.....9.75
Trenton,N.J. A7	.....10.05
Waukegan,Ill. A7	.....9.75
Wor'ster,Mass. A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	.....16.50
Bartonville,Ill. K4	....16.40
Chicago W13	.....16.30
Cleveland A7	.....16.30
Crawfordsville,Ind. M8	.16.40
Fostoria,O. S1	.....16.30
Houston S5	.....16.55
Jacksonville,Fla. M8	...16.65
Johnstown,Pa. B2	.....16.30
KansasCity,Mo. S5	....16.55
Kokomo,Ind. C16	.....16.30
Minnequa,Colo. C16	...16.55
Monessen,Pa. P16	.....16.30
Muncie,Ind. I-7	.....16.50
Palmer,Mass. W12	....16.60
S.SanFrancisco C10	...17.15
Waukegan,Ill. A7	.....16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	....17.15
Monessen,Pa. P16	.....17.15
Roebling,N.J. R5	.....17.65

ROPE WIRE	(A)
Bartonville,Ill. K4	.....13.45
Buffalo W12	.....13.45
Fostoria,O. S1	.....13.45
KansasCity,Mo. U3	...13.70
Johnstown,Pa. B2	.....13.45
Monessen,Pa. P7	.....13.45
Muncie,Ind. I-7	.....13.65
Palmer,Mass. W12	....13.75
Portsmouth,O. P12	....13.45
Roebling,N.J. R5	.....13.75
St.Louis L8	.....13.45
SparrowsPt.,Md. B2	..13.55
Struthers,O. Y1	.....13.45
Worcester,Mass. J4	....13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.35
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.lIper 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)

	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville B8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'im'r,Mass.W12	18.15	19.70†
Pitts.Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant quality (6 to 8 gage)

	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48)A11	9.10 9.775†
Bartonville(48) K4	9.10 9.80
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansCity(48) S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)	N15 9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0
Undersize Body (rolled thread)	
½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts

Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Large diameters and longer lengths	35.0

High Tensile Structural Bolts (Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. (ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:	
¼ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter	+85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:	
6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85, 7/16 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Pueblo,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.75	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5% Carbon Base	10% Carbon Base	15% Carbon Base	20% Carbon Base	Sheets 20% Carbon Base
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.10	$43.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††	Structural Shapes	Carbon	Floor
Atlanta	8.59‖	9.86‖	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	9.80(a)	10.00(b)	9.99	....	11.45(c)	10.05(d)	11.80#	16.38	9.55	9.90(e)	10.50
Birmingham	9.43(a)	10.20(b)	....	....	10.91(c)	9.59(d)	13.14#	16.76	9.00	9.79(e)	10.90
Boston	10.07	11.42	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54(a)	8.79(b)	10.87	52.33	10.32(c)	8.75(d)	11.25#	15.16	9.39	8.71(e)	10.50(f)
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	9.65(a)	9.65(b)	....	52.00	10.85(c)	8.90(d)	13.10#	16.55	8.35	9.65(e)	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54(a)	8.79(b)	10.76	52.33	10.30(c)	8.64(d)	11.25#	15.05	9.00	8.47(e)	10.26(f)
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.80(a)	9.31(b)	10.47	....	10.32(c)	8.70(d)	11.49#	16.54	9.38	8.60(e)	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; ‖2 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡⅝ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.
(a)10 Ga.; (b)20 Ga.; (c)⅛ x 1 in.; (d)¾-2½ in.; (e)¼ x 84 in.; (f)¼ x 36 in.
Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [3]—30,000 lb; [2]—1000 to 4999 lb; [1]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton unit

Foreign wolframite, good commercial quality	$16.00-$16.50*
Domestic, concentrates f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00
Wire Rods:	
Carbon, ⅜" to under ¼ in.	5.30
Carbon, ¼ in. to 47/64 in.	5.70
Alloy	6.40
Wire (carload lots)	8.40
Bars & Small Shapes:	
Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Structural Size Angles & Zees	5.40
Plates:	
Carbon	5.45
Sheets & Coils, Hot Rolled:	
Carbon Sheets	5.00
Carbon Strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill Products (Per Base Box; 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.i. lots, (per keg) **400 keg min.**	$8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe.	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh)	29.25
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	35.70-52.20†
Bronze, 5000-lb lots	53.50-57.50†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	54.00-58.30†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	46.50-55.00
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00*
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	20.70-33.90†
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom**
Chromium electrolytic 99.8% Cr, min, metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven foundry Coke

Birmingham, oven	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene one deg (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$6.60*	....	*$6.55*	*$6.46*	*$6.95*
Bar Size Angles	*6.60*	....	*6.55*	*6.46*	*6.95*
Structural Angles	*5.93*	....	*5.88*	*5.78*	*6.18*
I-Beams	*5.93*	....	*5.88*	*5.78*	*6.18*
Channels	*5.93*	....	*5.88*	*5.78*	*6.18*
Plates (basic bessemer)	*6.30*	....	*6.25*	*6.15*	*6.55*
Sheets, H.R.	*9.50*	....	*9.45*	*9.35*	*9.75*
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	*10.40*	....	*10.35*	*10.25*	*10.75*
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	*10.55*	....	*10.50*	*10.40*	*10.80*
Sheets, C.R. (drawing quality)	*12.00*	....	*12.95*	*12.85*	*13.25*
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	....	25.28	24.99	26.68
Barbed Wire (†)	*8.25*	....	*8.20*	*8.10*	*8.50*
Merchant Bars	*6.58*	....	*6.53*	*6.44*	*6.81*
Hot-Rolled Bands	*9.90*	....	*9.85*	*8.75*	*10.15*
Wire Rods, Thomas Commercial No. 5	6.40	....	6.40	6.25	6.60
Wire Rods, O. H.	6.90	....	6.90	6.75	7.10
Bright Common Wire Nails (§)	*9.00*	....	*9.05*	*8.95*	*9.35*

*Books closed for 1959-60 shipping season. †Per 82 lb net reel. ‡Per 100-kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.6f for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%. Carload, lump, bulk, max 0.07% C 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.
Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr. 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr. **Low-Carbon Ferrochrome:** Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb, No. 79. 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W.Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c; 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

CF&I-CLAYMONT'S
alloy steel plates on the job in
Esso's new Powerforming Unit

The job: Produce five spherical reactors—Catalytic Reforming Units—to convert low octane gasolines to higher octane motor fuels.

The job site: Esso Standard Oil Company's new Powerforming Unit at Baton Rouge, Louisiana.

The job-team: Esso Research and Engineering Company prepared the basic design. Bechtel Corporation, San Francisco, developed the basic requirements and designed the various details. Wyatt Metal & Boiler Works, Inc., produced the shop drawings and fabricated the units in their Houston shops.

CF&I's Claymont, Delaware plant produced the alloy steel plates . . . for the shells and for manheads and nozzle connections.

The specifications: The CF&I-Claymont Alloy Steel Plates were manufactured to ASTM Specifications for Carbon-Molybdenum and Chrome-Molybdenum Steel . . . designed for high pressure and high temperature applications, with increased tensile and creep strength provided in accordance with varying safety factor requirements.

Minimum plate thickness—1⅞ inches.

I.D. of reactors—17 feet 1½ inches.

Net weight of each shell, without internal insulation—95,000 pounds.

The result: Another job well done through co-operative effort.

The CF&I-Claymont plant is equipped and ready to work with *you* by producing plate for any job, to any specification . . . in carbon, alloy or stainless-clad steels . . . in the dimensions, gage and shape of your choice. What's more, Claymont's completely-equipped Fabrications Shop turns out partially or full-fabricated steel plate components (for machinery or structural applications) in accordance with user requirements . . . in small or large-quantity lots.

Get complete information and prompt service through the CF&I sales office nearest you.

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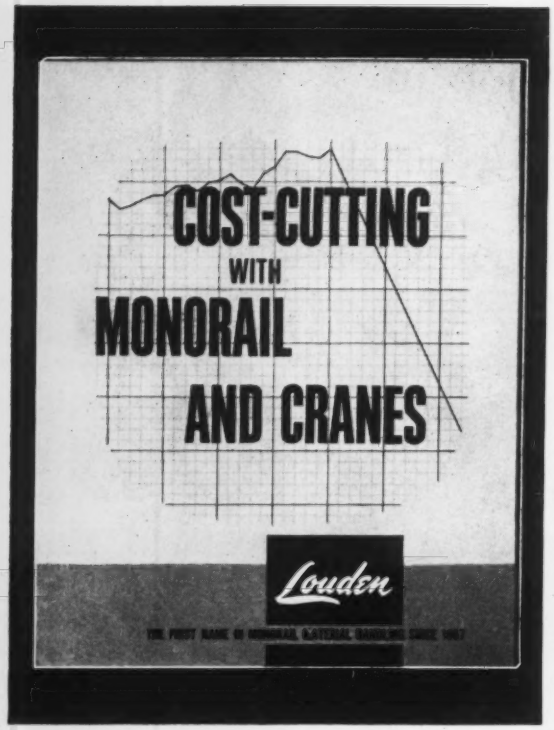

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Scrapmen Expect Buying Pickup

STEEL's index on heavy melting steel is unchanged at $45.33. Trade marks time, pending new purchasing movement by steel mills. Supplies are adequate

Scrap Prices, Page 164

• **Pittsburgh** — With local mills rapidly getting back to high level operations, brokers are waiting to see which companies will come back into the market. The district's biggest consumer bought No. 2 heavy melting scrap at $40.50 a ton and No. 2 bundles at $34.50, allowing 50 cents extra for freight to its most remote plant. In addition, it's calling for prompt shipment of the No. 2 bundles it bought at $30 a ton in August and September. A smaller mill that continued to buy scrap regularly while it was on strike estimates it could operate at 65 or 70 per cent of capacity for the next 35 days without buying another pound.

• **Chicago**—Resumption of steelmaking has brought no rush to purchase scrap, but the mills are starting to accept deliveries of material purchased by brokers for their accounts during the strike. Denials of such negotiations were common during the strike period.

The mills had good inventories prior to shutdown, and by not hurrying into the market now they are holding in check a possible price spiral.

• **Philadelphia**—Prices are strong. The only change, however, is in low phos structurals and plates which have advanced to $51-$53 delivered. The resumption of operations at strikebound steel mills is resulting in the release of tonnage ordered before or during the strike. Little new buying is reported. It appears that if the mills wish to compete with export demand they will probably have to pay $2 to $3 a ton over the prices now quoted on major grades being exported—No. 1 heavy melting, No. 2 heavy melting, and No. 2 bundles.

• **New York** — Brokers' buying prices are unchanged, but the market is strong. Export demand is active and a steady pickup in tonnage movement to domestic mills is expected.

• **Cleveland**—Resumption of steelmaking operations has not resulted in any marked pickup in new buying by the mills. Releases against tonnages placed during the strike are expected in the early stages of the back-to-work period; new buying is being deferred until the supply situation and requirements over the next couple of months have been fully clarified. The market is firm, but prices are strong, though unchanged.

• **Detroit** — The market is quiet. There is no mill buying, and dealer trading is light. Little activity is expected until monthend auto lists come out. Prices are unchanged, and the trend is uncertain.

• **Buffalo** — Strength in cast iron scrap features the market. Canadian demand and the prospect of new orders from area foundries have put zip into the market. Dealers look for a price hike of $1 or $2 a ton on the cast grades when local foundries make new purchases.

• **Cincinnati**—The market is firm and prices are strong. A local mill is expected to announce its buying program this week. The market has anticipated higher prices on any new buys that are made, brokers marking up their buying prices $1 to $2 a ton. Strength in the railroad grades moved 18 in. and under rails up $1 to $63-$64. Random rails are also up $1 to $55-$56.

• **St. Louis**—Prices are unchanged. Not a great deal of scrap business is being done locally. However, bargeloads of material are coming in from the north, the mills buying from outside sources.

• **Birmingham** — Prices advanced last week on some cast iron items in a generally strong market. A large local electric furnace plant returned to the market, increasing its offering prices $2 a ton. The price on turnings is higher.

(*Please turn to Page* 169)

No matter for what reason you come to Baltimore, the chances are we're nearest to where you want to go.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Nov. 11, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 11	$45.33
Nov. 4	45.33
Oct. Avg.	44.00
Nov. 1958	41.42
Nov. 1954	33.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	40.00-41.00
No. 1 dealer bundles	45.00-46.00
No. 2 bundles	*34.00-35.00*
No. 1 busheling	45.00-46.00
No. 1 factory bundles	*55.00-56.00*
Machine shop turnings	24.00-25.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals:	
2 ft and under	51.00-52.00
3 ft and under	50.00-51.00
Heavy turnings	35.00-36.00
Punchings & plate scrap	*56.00-57.00*
Electric furnace bundles	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	49.00-50.00
Stove plate	46.00-47.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	47.00-48.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 2 ft and under	*66.00-67.00*
Rails, 18 in. and under	*67.00-68.00*
Random rails	60.00-61.00
Angles, splice bars	59.00-60.00
Railroad specialties	59.00-60.00
Rails, rerolling	65.00-66.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	46.00-47.00
No. 1 hvy melt., dealer	44.00-45.00
No. 2 hvy melting	41.00-42.00
No. 1 factory bundles	49.00-50.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	29.00-30.00
No. 1 busheling, indus.	44.00-45.00
No. 1 busheling, dealer	42.00-43.00
Machine shop turnings	24.00-25.00
Mixed borings, turnings	26.00-27.00
Short shovel turnings	26.00-27.00
Cast iron borings	26.00-27.00
Cut structurals, 3 ft	51.00-52.00
Punchings & plate scrap	53.00-54.00

Cast Iron Grades

No. 1 cupola	57.00-58.00
Stove plate	52.00-53.00
Unstripped motor blocks	48.00-49.00
Clean auto cast	63.00-64.00
Drop broken machinery	63.00-64.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00
R.R. malleable	65.00-66.00
Rails, 2 ft and under	64.00-65.00
Rails, 18 in. and under	65.00-66.00
Angles, splice bars	57.00-58.00
Axles	57.00-58.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles, solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	31.00-32.00
No. 1 busheling	*50.00-51.00*
No. 1 bundles	47.00-48.00
No. 2 bundles	29.00-30.00
Machine shop turnings	18.00-19.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	*51.00-52.00*
Electric furnace bundles	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00

CLEVELAND

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	28.00-29.00
No. 1 factory bundles	46.00-47.00
No. 1 bundles	*42.00-43.00*
No. 2 bundles	26.00-27.00
No. 1 busheling	42.00-43.00
Machine shop turnings	15.00-16.00
Short shovel turnings	21.00-22.00
Mixed borings, turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut foundry steel	*45.00-46.00*
Cut structurals, plate 2 ft and under	51.00-52.00
Low phos. punchings & plate	43.00-44.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Charging box cast	41.00-42.00
Heavy breakable cast	41.00-42.00
Stove plate	49.00-50.00
Unstripped motor blocks	39.00-40.00
Brake shoes	39.00-40.00
Clean auto cast	58.00-59.00
Burnt cast	49.00-50.00
Drop broken machinery	58.00-59.00

Railroad Scrap

R.R. malleable	70.00-71.00
Rails, 2 ft and under	67.00-68.00
Rails, 18 in. and under	68.00-69.00
Rails, random lengths	61.00-62.00
Cast steel	53.00-54.00
No. 1 railroad cast	58.50-59.50
Railroad specialties	*59.00-60.00*
Angles, splice bars	59.00-60.00
Rails, rerolling	74.00-75.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	37.00-40.00
No. 2 heavy melting	35.00-38.00
No. 1 bundles	46.50
No. 2 bundles	26.00
No. 1 busheling	46.50
Machine shop turnings	20.00
Short shovel turnings	20.00

Cast Iron Grades

No. 1 cupola	55.00
Charging box cast	46.00
Heavy breakable cast	44.00
Unstripped motor blocks	45.00
Clean auto cast	56.00
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00
Rails, 18 in. and under	56.00
Rails, random lengths	51.00
Rails, rerolling	65.00
Angles, splice bars	50.00

BIRMINGHAM

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	32.00-33.00
No. 1 bundles	*37.00-38.00*
No. 2 bundles	25.00-26.00
No. 1 busheling	*42.00-43.00*
Cast iron borings	14.00-15.00
Machine shop turnings	*25.00-26.00*
Short shovel turnings	*28.00-29.00*
Bar crops and plate	46.00-47.00
Structurals & plates	46.00-47.00
Electric furnace bundles	*42.00-43.00*
Electric furnace:	
3 ft and under	*41.00-42.00*
2 ft and under	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	*55.00-56.00*
Stove plate	*55.00-56.00*
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*42.00-43.00*
Rails, 18 in. and under	56.00-57.00
Rails, rerolling	*61.00-62.00*
Rails, random lengths	51.00-52.00
Angles, splice bars	49.00-50.00

PHILADELPHIA

No. 1 heavy melting	45.00
No. 2 heavy melting	39.00
No. 1 bundles	48.00
No. 2 bundles	29.00
No. 1 busheling	48.00
Electric furnace bundles	49.00
Mixed borings, turnings	21.00-22.00†
Short shovel turnings	27.00
Machine shop turnings	24.00
Heavy turnings	35.00†
Structurals & plates	*51.00-54.00*
Couplers, springs, wheels	50.00
Rail crops, 2 ft & under	66.00-68.00

Cast Iron Grdes

No. 1 cupola	46.00-47.00
Heavy breakable cast	48.00
Drop broken machinery	54.00
Malleable	68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	37.00-38.00
No. 2 bundles	21.00-22.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	14.00-15.00
Low phos. structurals & plates	36.00-37.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	35.00-36.00

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Short shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos structurals and plate, 2 ft and under	43.00-44.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	45.00-46.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	38.00-39.00
No. 2 bundles	28.00-29.00
No. 1 busheling	38.00-39.00
Machine shop turnings	21.00-22.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	24.00-25.00
Cast iron borings	23.00-24.00
Low phos. 18 in.	49.00-50.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
Rails, 18 in. and under	*64.00-64.00*
Rails, random lengths	*55.00-56.00*

HOUSTON

(Exporters' buying prices; f.a.s.)

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	37.00-38.00
No. 2 bundles	26.50-27.50

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00†
No. 2 heavy melting	31.00†
No. 1 bundles	34.00
No. 2 bundles	20.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	48.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable	35.00
Foundry malleable	43.00-44.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	25.50-26.50
No. 1 bundles	*37.00-38.00*
No. 1 busheling	*37.00-38.00*
Machine shop turnings	*13.00-14.00*
Short shovel turnings	15.00-16.00
No. 1 cast	*39.00-40.00*
Mixed cupola cast	*38.00-39.00*
No. 1 machinery cast	40.00-43.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	40.00-41.00
No. 2 bundles	23.00-24.00
No. 1 busheling	37.00-38.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	18.00-19.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	40.00-41.00
Heavy breakable	40.00-41.00
Unstripped motor blocks	32.00-33.00
Charging box cast	40.00-41.00
Clean auto cast	53.00-54.00

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	32.00-33.00
No. 1 bundles	25.00
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	36.00
No. 1 bundles	35.00
No. 2 bundles	22.00
Machine shop turnings	18.00
Shovel turnings	20.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	33.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

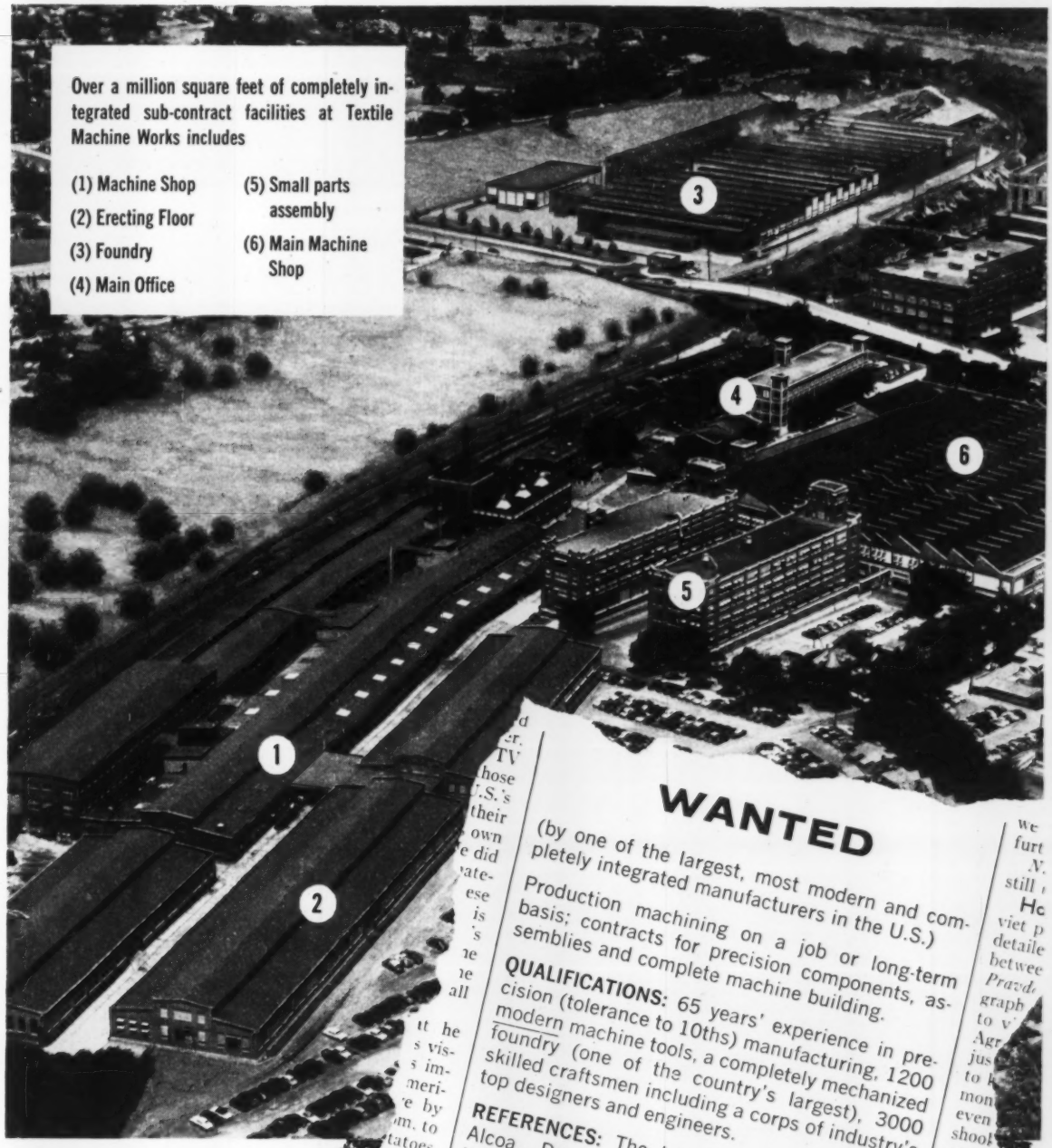
(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	*24.00*
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Gradest

No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.



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TEXTILE MACHINE WORKS
CONTRACT DIVISION, READING, PENNA.

Copper Pinch to Tighten

As steel supplies become more plentiful, you'll see a greater demand for copper. But there's not enough to go around now and little hope for an early labor settlement

Nonferrous Metal Prices, Pages 168 & 169

RESUMPTION of production at steelmaking facilities will aggravate the already tight copper supply situation. Look for an even greater scramble for the red metal as some users whose operations were shut down or curtailed for lack of steel begin to step up their production.

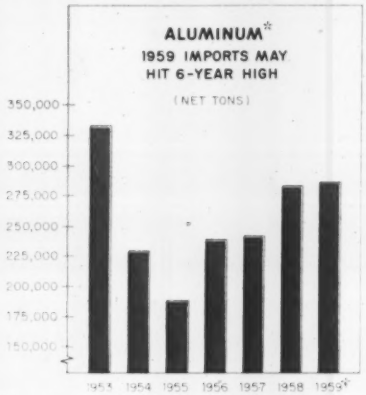
• **Pinch Continues**—It doesn't look like any relief will be forthcoming soon. With about 85 per cent of the domestic industry's mine and refinery capacity out, the three month strike has cost an estimated 300,000 tons in refined production to date. Losses will continue to mount at a rate around 90,000 to 100,000 tons a month.

Copper surpluses are disappearing all over the world as producers' stocks tumble here and abroad. At least one major strike-bound producer is still supplying regular customers with some metal, but in most cases they are getting only a fraction of their normal needs.

Even the considerable tonnage of copper imported in recent weeks hasn't removed the pinch. And plenty of copper has been brought in: September net imports totaled 67,000 tons. Some of the foreign copper is available from dealers but the price is high—over 40 cents a pound. No custom smelted copper will be available for sale between now and yearend.

• **No Peace Pipe**—There's little indication the steel injunction will bring a hurried peace to copper. In fact, the United Steelworkers of America, which generally sets the copper labor pattern (although it ranks second to the International Union of Mine, Mill & Smelter Workers in members), hasn't seemed too interested in a settlement. "Uninformed and disinterested, with eyes glued to the steel industry," is the way one industry negotiator describes the attitude of union brass.

In any event, it's unlikely you'll see a Taft-Hartley injunction in copper, at least any time soon. The government just wouldn't have a case, believe metalmen. One mine state senator has petitioned the President to appoint a fact finding board to investigate the copper deadlock, but Washington sources believe the move is mainly a reaction to home town pressures and won't get serious consideration.



* Includes crude metal, alloys, mill products.
† Estimated by STEEL.
Source: U.S. Department of Commerce.

It is possible, though, that you may see more serious negotiations from now on. At press time, rumor had it that Phelps Dodge Corp. had made an offer of 15.7 cents an hour in wages and fringes over a two year period. And Anaconda Co. and USW have agreed to indefinitely extend the current contract at the Raritan refinery in New Jersey.

• **More Expensive**—The tightening supply picture has caused a steady strengthening in world prices over the last few weeks. Result: All but one of the major domestic producers have gone up 1.5 cents to 33 cents a pound. So you'll now have to pay on the basis of 33 cent copper for wire and brass mill products.

Zinc Business Up

Zinc shipments will be up in November and December. From the moment the steel injunction was made effective, producers have been receiving instructions from galvanizers to ship them the prime western zinc that had been ordered previously.

The zinc industry has had little to complain about in recent weeks. October domestic shipments, 63,910 tons, were the highest of any month since June, reports the American Zinc Institute Inc. In fact, even with the steel strike, October was better than seven months of last year.

Industry people say shipments have stayed healthy because of the good demand from brass mills and diecasters. Zincmen report a heavy increase in zinc usage in 1960 model autos, particularly in large components like instrument cluster panels (one 1960 model reportedly has a 23 lb zinc diecasting) and grilles.

NONFERROUS PRICE RECORD

	Nov. 10 Price	Last Change	Previous Price	Oct. Avg	Sept. Avg	Nov., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	31.50	Nov. 6, 1959	30.75	31.278	31.500	29.415
Lead	12.80	Aug. 24, 1959	11.80	12.800	12.800	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	101.75	Nov. 10, 1959	101.375	31.278	31.500	29.415
Zinc	12.50	Nov. 2, 1959	12.50–13.00	12.259	11.360	11.386

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

NEW! ANOTHER BIG BONUS IN ALCOA SCREW MACHINE STOCK

NOW! A COMPLETE ALUMINUM SCREW MACHINE STOCK BOOK FOR ESTIMATORS AND OPERATORS

The production of aluminum screw machine parts often calls for a lot of cross-reference table scrambling, complicated formulas to convert steel or brass to aluminum data, and time-consuming computations. Now Alcoa has the solution! For the first time in the screw machine industry, Alcoa makes available a comprehensive *Aluminum Handbook* for estimators and production people. The detailed estimator's section of this fact-filled booklet contains pages of tables to simplify your use of Alcoa® Aluminum. This extensive collection of data will make the toughest screw machining job a cinch to calculate.

Alcoa's handbook contains hundreds of conversions for aluminum screw machine stock, weights of various stock sizes, sfpm at various spindle speeds, weights of stock segments, thread tolerances and weights per 1,000 pieces, among other useful data you'll use every day.

There's also a complete section on *properties and specifications* of aluminum alloys that you'll find a handy reference. A *shop practice* section gives a quick solution for a host of work defects that occur in screw machining.

Your Alcoa man has reserved a copy of this handbook for you. Call the nearest Alcoa sales office or Alcoa Distributor today and he'll bring over your copy and show you how to cut hours off your work. Look for the Alcoa sales or distributor office in the Yellow Pages of your telephone directory under "Aluminum."

And don't forget these many additional bonuses when you deal with Alcoa:

- **Alcoa Aluminum Screw Machine Stock allows up to four times higher cutting speeds than other materials—up to 1,000 surface feet per minute.**
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- **Stock in specific 12-ft lengths at no extra cost . . . in rounds to 3⅜ in. and hexagons to 3 in. across flats.**
- **Chamfered ends at no extra cost in a wide range of sizes and alloys.**
- **A guaranteed market for up to 60 per cent of your turnings and borings from four aluminum alloys.**
- **An extensive mill inventory to back up the nationwide distributor stocks and cover emergency requirements of mill customers.**

ALCOA ALUMINUM

Your Guide to the Best in Aluminum Value

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.40 per lb deld.

Cobalt: 99+ %, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 30.00-33.00 deld.; custom smelters, nom.; lake, 33.00 deld.; fire refined, 29.75-32.75 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $220-222 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $22-24 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom., sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 101.75.

Titanium: Sponge, 99.3+ % grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+ % hydrogen reduced, $3.00-3.80.

Zinc: Prime western, 12.50; brass special, 12.75; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 13.75; special high grade, 14.00 deld. Diecasting alloy ingot No. 3, 15.75; No. 2, 16.25; No. 5, 16.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7.00 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.50; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.925, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.905, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.85-38.35; l.c.l., 37.48-38.98. Weatherproof, 20,000-lb lot, 37.42-38.55; l.c.l., 38.17-39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.85
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.530	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length diam., 0.375-8 in., "F" temper; 2014 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheets and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.50-27.00; No. 2 heavy copper and wire, 24.00-24.50; light copper, 22.00-22.50; No. 1 composition red brass, 19.50-19.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	54.36c	....	57.32	29.000	29.000	28.250
Yellow Brass	49.82	35.31d	50.36	53.23	22.250	21.250	20.250
Low Brass, 80%	52.78	52.72	53.32	56.09	24.750	24.500	24.000
Red Brass, 85%	53.83	53.77	54.37	57.14	25.750	25.500	25.000
Com. Bronze, 90%	55.42	55.36	55.96	58.48	26.750	26.500	26.000
Manganese Bronze	58.10	51.75	62.19	....	20.875	20.625	19.875
Muntz Metal	52.45	47.76	....	....	20.875	20.625	20.125
Naval Brass	54.37	48.18	60.93	57.78	20.750	20.500	20.000
Silicon Bronze	62.11	61.30	61.65	79.78	28.375	28.125	27.375
Nickel Silver, 10%	65.23	67.56	67.56	....	26.875	26.625	14.937
Phos. Bronze	76.69	77.19	77.19	78.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 18.00-18.25; new brass clippings, 15.50-15.75; light brass, 12.00-12.25; heavy yellow brass, 13.50-13.75; new brass rod ends, 13.25-13.50; auto radiators, unsweated, 14.75-15.25; cocks and faucets, 15.00-15.50; brass pipe, 15.00-15.50.

Lead: Soft scrap lead, 8.50-9.00; battery plates, 4.25-4.50; linotype and stereotype, 10.00-10.50; electrotype, 8.25-8.75; mixed babbitt, 9.25-9.75.

Monel: Clippings, 30.00-32.00; old sheets 26.00-28.00; turnings, 20.00-22.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 3.75-4.00; old diecast scrap, 2.25-2.50.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.25-12.75; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.75-16.25.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire, 26.50; light copper 24.00; refinery brass (60% copper) dry copper content, 24.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire, 26.50; light copper, 24.00; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 16.50; yellow brass turnings, 15.50; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.40.

Copper: Flat-rolled, 49.29; oval, 47.50; 5000-10,000 lb; electrodeposited, 42.50, 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 119.50; 200-499 lb, 118.00; 500-999 lb, 117.50; 1000 lb or more, 117.00.

Zinc: Balls, 19.75; flat tops, 19.75; flats, 22.50; ovals, 21.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.10; 100-600 lb, 69.70; 700-1900 lb, 67.00; 2000-9900 lb, 65.10; 10,000 lb or more, 63.80.

Stannous Chloride (Anhydrous): 25 lb, 154.40; 100 lb, 149.50; 400 lb, 147.10; 800-19,900 lb, 106.20; 20,000 lb or more, 100.10.

Stannous Sulphate: Less than 50 lb, 139.60; 50 lb, 109.60; 100-1900 lb, 107.60; 2000 lb or more, 105.60.

Zince Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 163*)

• **Houston** — Prices are firm and unchanged. Export demand is moderate. Inland Texas brokers, working on a November order from the Lone Star (Tex.) mill, are making headway. With the autumn harvest out of the way, country scrap has started to move. At least three cargoes are being loaded at Houston. Other loadings are scheduled at Beaumont and Baton Rouge.

• **San Francisco**—Local area mills say they can buy top grade steel scrap at $36 a ton, but dealers report bulk sales for export are being made at $38 a ton for No. 1 heavy melting. There is also a $2 spread between the mill and export markets on No. 2 heavy melting and No. 1 bundles.

• **Los Angeles** — Although little scrap is moving, the reopening of strikebound steel mills is expected

WANTED

2 Used Cranes—15 ton capacity hoist—30 ft. lift—38'7" span—wheels to run on 35 lb. rail—3/60/220—AC current. Maximum wheel load 25,000 lbs. 125 ft. minimum trolley speed. 250-300 ft. min. bridge speed—magnetic controls. 25-30 ft. min. hoist speed. Mail complete description and offer to J. A. Graham, The Dayton Steel Foundry Company, P. O. Box 1022, Dayton 1, Ohio.

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40,000 # 2¼" to 12" S.A.E. 10-40, Domestic Steel, Round Bar Stock, standard lengths. Cheap.

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Help Wanted

Man wanted to take charge of finishing operations of a leading Steel Foundry located in California. The man we want must have leadership ability. He must assume full responsibility and be capable of planning and following through with a Cost Reduction Program. Box 805, STEEL, Penton Bldg., Cleveland 13, Ohio.

COKE OVEN BY-PRODUCT SUPERVISORS
Well-established corporation operating coke ovens and by-product plant in Alabama needs technically trained and experienced supervisors capable of qualifying in short time for high-level management positions. College training preferred. Submit full resume. All replies confidential. Reply Box 804, STEEL, Penton Building, Cleveland 13, Ohio.

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We have been asked to seek, in strict confidence on both sides, an executive for a top sales position in a substantial company selling to the steel industry. Must have steel production experience—preferably open hearth—combined with executive sales and service contact within the steel industry. 10 to 15 years experience. Location: midwest. Reply including education, details of your steel production and sales experience, and salary requirements in first letter.

Address
W. Gail Camp, President.

EXECUTIVE SERVICE CORPORATION
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Technical sales position with large metal company in the heat and corrosion resistant alloy field. Engineering degree preferred. Opportunity includes thorough mill training program. Submit resume with application.

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Penton Bldg. Cleveland 13, Ohio.

WANTED

Any amount up to 20,000# of ⅝" Hex B1112, C1213, B1113, or equivalent Cold Drawn Steel Screw Stock. Will trade any or all of the following:

Steel Screw Stock:
450 Bars $\frac{3}{32}$" Rd. B-1113 by 12' long.
734 Bars $\frac{7}{16}$" Rd. C-1213 by 12' long.
1516 Bars $\frac{7}{16}$" Rd. C-1213 by 14'—16' long.
704 Bars $\frac{11}{64}$" Rd. B-1113 by 14'—16' long.
150 Bars ½" Rd. C-1019 by 16' long.
790 Bars ⅝" Rd. B-1113 by 16' long.
432 Bars ⅝" Rd. C-1213 by 16' long.

Cold Rolled Strip Steel:
3 Coils—approx. 343 # .047" + .0035"—.002" x .520" + or — .005" wide Temper 1, Edge 3, Finish 2, Oiled.
39 Coils—approx. 6699 # .102" + .004"—.002" x $1\frac{7}{64}$" + or — .010" wide Temper 5, Edge 3, Finish 2, Oiled.
6 Coils—approx. 385 # .0598" + .0035"—.002" x .625" + or — .005" wide Temper 1, Edge 3, Finish 2.
2 Coils—approx. 124 # .0239" by .942" + or — .005" wide Temper 5, Edge 3, Finish 2, Oiled.

All material in good condition. Material offered subject to prior sale or disposition.

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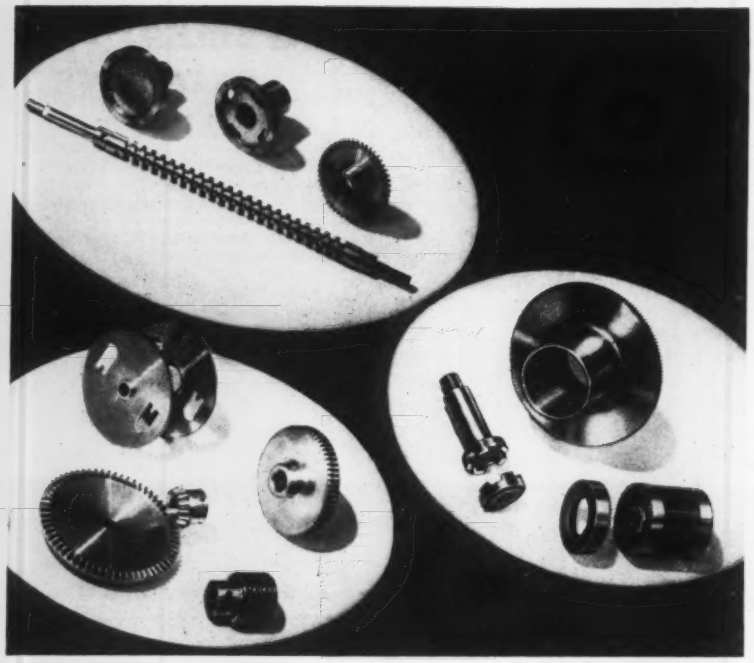

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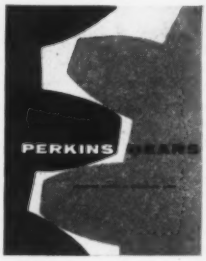

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to stimulate demand. Prices are unchanged.

• **Seattle** — Reopening of strike-bound steel mills is expected to generate a strong demand for scrap, but except for some export sales, there has been little activity in the market.

Pig Iron . . .

Pig Iron Prices, Page 158

Although the majority of blast furnaces were down for a record 116 day period, pig iron supplies were still ample on Nov. 7 when the Supreme Court upheld an injunction against the striking steelworkers. Supplies have been augmented by heavy imports.

A steady flow of hot metal is required to support steelmaking operations. Hot metal demand will grow steadily during the next few weeks. On the other hand, users of merchant iron have been forced to reduce their operations as a result of a slowdown in demand for castings. A pickup in this business will be delayed until the automotive industry and other large users of castings get a steady flow of other components, especially steel products.

A heavy movement of pig iron on the Great Lakes is developing as shippers rush to complete their commitments before the close of the navigation season.

Phoenix Steel Corp. will blow in its Chester, Pa., blast furnace Dec. 1. The stack has been down for a number of months.

Iron Ore . . .

Iron Ore Prices, Page 159

Shipments of Lake Superior iron ore totaled 1,096,450 gross tons in October, reports the American Iron Ore Association. The total was down 7,384,185 tons compared with the 8,480,635 tons moved in October, 1958. October shipments: 273,344 tons from U. S. ports, 823,106 tons from Canadian.

The lake ore movement in the 1959 shipping season to Nov. 1 totaled 38,230,585 tons, down 10,033,567 from the 48,264,152 moved to the same date in the 1958 navigation season. Of the total, 34,475,506 tons were moved through U. S. ports, and 3,755,079 tons through Canadian.

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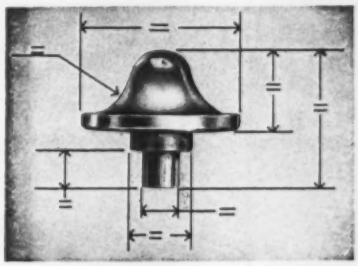
IT PAYS TO HAVE HUBBELL GOOD CONNECTIONS

Manufacturers of Cold Headed Fasteners Since 1888

OVER **10** TIMES THE RATE AT **50%** SAVING IN RAW MATERIAL



Another example of how Hubbell Cold Heading produces Better Parts at Faster Speeds, at Lower Cost

THE PART:
Click Button

THE MATERIAL:
Brass

THE METHOD:
Hubbell cold heading in place of screw machining.

THE RESULT:
This brass click button was machined previously from bar stock, involving several different operations that removed nearly 50% of the total weight of the original stock . . . a wasteful, time-consuming, costly process.

Hubbell now produces essentially the same part at tremendous savings in time and material cost.

a. Production is increased from the original rate of 5.5 pcs. p.m. to cold heading rate of 60 pcs. p.m.

b. Labor, overhead and material cost has been reduced 36%.

c. The finished part is stronger, more accurate, with greater uniformity.

Hubbell Cold Heading may provide equally dramatic results for you. Whether it is presently cold headed or not, send blueprint of part or sample for analysis and estimate.

HARVEY HUBBELL, Inc. *Machine Screw Dept.*
Bridgeport 2, Connecticut

Kindly estimate on the enclosed sample (blueprint) Quantity _____

Name _____
Title _____
Company _____
Address _____

another special from ACIPCO

ERIE FOUNDRY CO. PICKS ACIPCO TUBING FOR CARBON EXTRUSION PRESS PLUNGER

You're looking at a new 2000-ton horizontal carbon extrusion press manufactured by the Erie Foundry Company's hydraulic press division. Designed for the production of carbon electrodes, the press features ACIPCO centrifugally spun steel tubing in its main ram plunger.

Custom-spun by ACIPCO, the plunger is 30.50" O.D. with 125 micro-inch finish and 2-5/8" wall thickness. Main ram is 42" in diameter and has a 105" stroke. Produced with heads statically cast at ACIPCO, the plunger's overall length is 144".

Fabricated applications such as this are a specialty with ACIPCO. Completely equipped to solve a wide variety of tubing problems, ACIPCO can serve your needs more efficiently and economically because all its facilities are under one roof. For expert consultation on centrifugally spun tube applications in your field . . . call on ACIPCO.

VERSATILE ACIPCO CENTRIFUGALLY SPUN STEEL TUBES

SIZE RANGE: Lengths up to 410" to meet modern machinery requirements have been produced. OD's from 2.25" to 50"; wall thicknesses from .25 to 4".

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steel, plain carbon steel and special non-standard analyses.

FURNISHED: As cast, rough machined, or finished machined, including honing. Complete welding and machine shop facilities for fabrication.

SPECIAL PRODUCTS DIVISION

AMERICAN CAST IRON PIPE CO.

BIRMINGHAM 2, ALABAMA

Mack-Hemp rolls are right for every mill

. . . IN MERCHANT MILLS

For typical conditions: Mack-Hemp *Technigrain* and *Technigrain Special* alloy iron rolls give you exactly the degree of wear resistance you need for normal production run conditions in roughers, strands and leaders. Tailored to your specific requirements, these rolls have deep hardness penetration to assure minimum wear in the passes through many redressings.

For finishing: You'll find that Mack-Hemp *Nironite C Special* nickel alloy grain iron rolls have the hardness and fine grain structure to roll a top-quality finish on your merchant products in normal production runs.

For severe, heavy-draft conditions: If you have a tandem set-up that's been giving you a roll breakage problem, you can cure its tendency with Mack-Hemp *Technikrome*, *Stironite* or *Supermetal* high-carbon alloy steel rolls. All of these roll types can be used for roughers, intermediates and finishers. They are alloyed for increased strength and wear resistance, with *Supermetal* and *Stironite* rolls showing somewhat higher hardness.

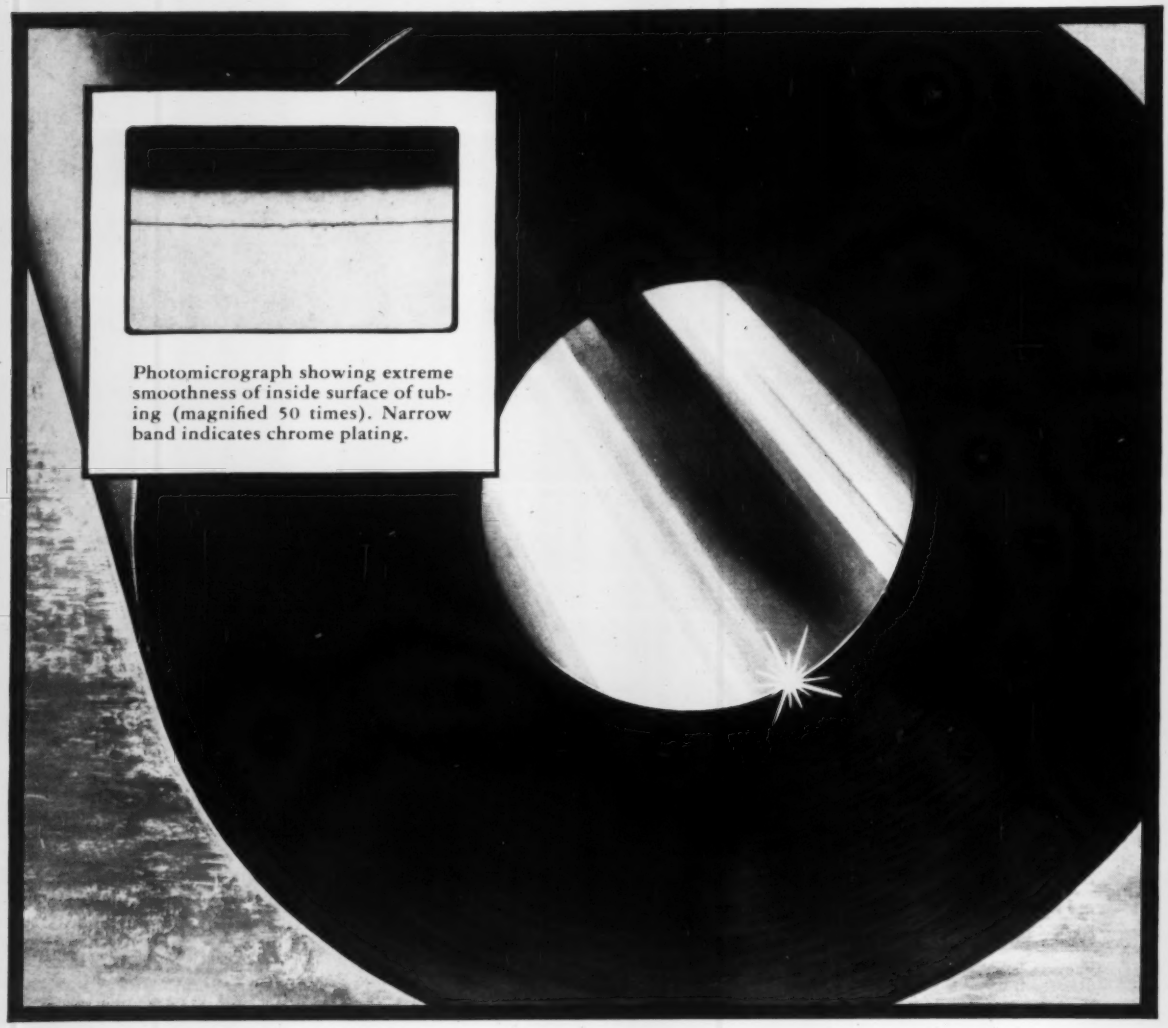
Every Mack-Hemp roll that leaves our plants has been as carefully mated to your specific mill conditions as we know how to make it. It's your guarantee of *getting more tonnage from the rolls with the striped red wabblers.*

MACKINTOSH-HEMPHILL DIVISION · PITTSBURGH · U.S.A.

BLISS

MACKINTOSH-HEMPHILL • DIVISION OF E. W. BLISS CO.

Pittsburgh and Midland, Pa.



Photomicrograph showing extreme smoothness of inside surface of tubing (magnified 50 times). Narrow band indicates chrome plating.

How to beat fatigue

caused by pulsating pressures up to 50,000 psi

PROBLEM: Manufacturers of polyethylene plastic were plagued by *costly* fatigue failures in the heavy wall, high pressure steel tubing they were using. *Result:* Costly, frequent replacements with attendant production and time losses.

CAUSE: The tubing's inside surface had slight, almost invisible imperfections which gave the pulsating pressures—varying between 35,000 and 50,000 psi—a toe hold for failures to start.

SOLUTION: Timken Company metallurgists recommended a specific low-alloy steel tubing that could be produced with a glossy-smooth interior surface. They used specially developed Timken Company processing techniques, based on more than 40 years of experience with all types of high pressure steel applications. Result—another special steel problem solved.

WHATEVER your special steel problem, it will pay you to use the experience of the experts—metallurgists of the Timken Company. Give us a call the next time you need help. The Timken Roller Bearing Company, Steel & Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

TIMKEN® *Fine Alloy* STEEL